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Schistocarpha oppositifolia (Kuntze) Rydb.—This essentially tropical species is widely distributed in tropical America, and according to Rydberg in his account of the genus (N. Amer. Fl. 34: 306. 1927) it extends northward to San Luis Potosí. A recent collection shows that it occurs, rather unexpectedly, also in Tamaulipas: Jaumave, stony river valley, September 30, 1931, *H. W. von Rozynski 76*.

Vernonia angusta (Gleason), comb. nov. *Eremosis angusta* Gleason, N. Amer. Fl. 33: 98. 1922.

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BOTANICAL SERIES

FIELD MUSEUM OF NATURAL HISTORY
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VOLUME XI NUMBER 6

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REVISION OF THE GENUS COREOPSIS

BY

EARL EDWARD SHERFF
RESEARCH ASSOCIATE IN SYSTEMATIC BOTANY

B. E. DAHLGREN
CURATOR, DEPARTMENT OF BOTANY
EDITOR

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REVISION OF THE GENUS COREOPSIS

EARL EDWARD SHERFF

PREFACE

The revision of the genus *Coreopsis* as set forth in the following pages is the outcome of a suggestion received in 1912. Early in that year Dr. Jesse M. Greenman, then Assistant Curator of Taxonomy at Field Museum (now Curator of the Herbarium at the Missouri Botanical Garden), selected from the Compositae the closely related genera *Bidens*, *Coreopsis*, and *Cosmos* as offering great promise for the student who should study them painstakingly. In turn, each of these genera has been studied by me since then. The results of my investigations in *Cosmos* have been summarized in large part in an earlier paper (Revision of the Genus *Cosmos*, Field Mus. Bot. Ser. 8: 401–447. 1932) and will be concluded in a subsequent treatment to appear in the *North American Flora*. My studies in *Bidens* and *Coreopsis* have been detailed in many articles which have appeared during more than two decades, particularly in the *Botanical Gazette* and the *American Journal of Botany*, but also in the *Journal of the Washington Academy of Sciences* and the *Journal of the Pan-Pacific Research Institution*. In the present state of our knowledge, it is impossible, of course, to render a complete account of all the species in these two genera. Perhaps many, especially in *Bidens*, remain to be discovered. I have, however, attempted a revisional survey of each genus which should be as complete for the entire world as the many facilities offered me for research would permit. Treatments of the species growing in North America are to appear soon in the *North American Flora*. A comprehensive revision of the entire genus *Bidens* will appear in separate volumes of the Field Museum Botanical Series. The present paper attempts a revisional summary of the entire genus of *Coreopsis*.

No attempt has been made to present an extended history of the genus *Coreopsis*. This history has been somewhat interlocked with that of *Bidens* and in my monograph of that genus I have presented a historical résumé to which readers are here referred. In addition, numerous references given accompanying the various sections (infra) may be consulted with profit.

Many of the world's principal scientific institutions have assisted by lending materials or by permitting access to their herbaria,

libraries, or gardens. My very deep gratitude should be expressed here to the staffs of all these institutions and particularly to the following individuals: Dr. Ivan Murray Johnston, Research Associate, Arnold Arboretum; Dr. Adolph Engler (deceased), former Director, Dr. Ludwig Diels, present Director, and Dr. Johannes Mattfeld, Curator, Botanical Garden of Berlin; Dr. Alfred Barton Rendle, former Keeper of Botany, and Dr. John Ramsbottom, present Keeper of Botany, British Museum of Natural History; Dr. E. De Wildeman, former Director, Dr. Walter Robyns, present Director, and Dr. P. Staner (until recently Attaché at the Museum of the Belgian Congo at Tervueren but now on the staff), of the National Botanical Garden at Brussels; Dr. Enrico Carano, former Director, Dr. Giovanni Negri, present Director, and Dr. Renato Pampanini, former Adjutant and Conservator at the Institute of Botany of the University of Florence (now Professor of Botany and Director at the Botanical Institute of the Royal University, Cagliari, Italy); Dr. John Isaac Briquet (deceased), former Director of the Conservatory and Botanical Garden of Geneva; Dr. Benjamin Lincoln Robinson (deceased), former Curator, and Mr. Charles A. Weatherby, Assistant Curator, Gray Herbarium of Harvard University; Dr. Edgar Irmscher, Curator of the Herbarium of the Botanical Institute at Hamburg; Sir David Prain, former Director, Sir Arthur W. Hill, present Director, Dr. Otto Stapf (deceased), former Keeper of Herbarium, Mr. A. D. Cotton, present Keeper of Herbarium, and Miss M. L. Green, Botanist, Royal Botanical Gardens of Kew; Dr. Benjamin Daydon Jackson (deceased), former Secretary of the Linnean Society of London; Dr. Jesse More Greenman, Curator of the Herbarium, Missouri Botanical Garden; Dr. Nathaniel Lord Britton (deceased), former Director, New York Botanical Garden; Dr. H. LeComte, honorary Professor, Dr. Henri Humbert, Professor, Mr. Louis Anfray (deceased), former Preparator, and Dr. Paul Danguy, Vice-Director, Museum of Natural History of Paris; Dr. Philip Munz, Professor of Botany, Pomona College; Dr. Ira L. Wiggins, Stanford University; Dr. William R. Maxon, Associate Curator, United States National Museum; Dr. Richard Wettstein-Westersheim (deceased), former Director, Botanical Garden and Institute of Vienna.

My work has been carried on from time to time in most of the above institutions and in numerous others, but principally in the Field Museum of Natural History. To the authorities of Field Museum am I indeed indebted for the many courtesies and invaluable aid extended to me over a long period of time. Especially do I

thank Mr. Stephen C. Simms, Director, Drs. Charles F. Millspaugh (deceased), former Curator of Botany, and B. E. Dahlgren, present Curator of Botany, and Mr. Paul C. Standley, Associate Curator of the Herbarium, for their assistance in many ways.

Much effort has been made to eliminate typographic errors in the text. Throughout the preparation of my original manuscript and final text I have been aided greatly in the proof reading by my wife, Fern R. Seeley Sherff. It is a pleasure to acknowledge here her cooperation.

During the progress of my work, I have photographed several hundred of the more important specimens studied, such as types and cotypes. Complete sets of these photographs are in my private collection and in the Herbarium of the Field Museum of Natural History. Throughout the text the term "cotype" is used to connote a duplicate of the type, as is usually shown, for example, by the use of the same collection number.

Genus **COREOPSIS**: Descriptio

L. Gen. Pl. ed. 5. Num. 879. 1754; Sp. Pl. 907. 1753 (maxima pro parte); *Acispermum* Neck. Elem. Bot. 1: 34, No. 64. 1790. (For other synonyms see under names of various sections.)

Plantae (familiae Compositarum) herbaceae vel saepe fruticosae, glabrae vel pubescentes. Folia opposita vel rarius alterna, indivisa atque integra dentatave, vel tripartita, vel semel bis terve ternatim vel pinnatim dissecta. Capitula mediocria vel majuscula, manifeste pedunculata vel pedicellata, solitaria vel laxe corymboso-paniculata, radiata. Involucri bracteae plerumque in 2 raro in 3–4 seriebus dispositae, basi plus minusve connatae, exteriores plerumque herbaceae vel submembranaceae adpressae vel saepe patentes, interiores plerumque majores brunneae vel flavae membranaceae. Receptaculum planum vel convexiusculum. Flores radii ligulati, 1-seriati, neutri vel rarius styliferi ac fertiles vel steriles, lamina patente integri vel paucidentati, plerumque flavi rarius rosacei vel discolores. Paleae planae vel concaviusculae membranaceae striatae flores tubulosos subtendentes. Flores tubulosi flavi vel superne colorati, hermaphroditi ac fertiles vel intimi steriles, regulares, corollae limbo parum ampliati apice breviter 4- vel saepissime 5-dentati, saepe ad gutturis basim anulo glabro pilosove circumscripti; antheris basi integris vel (auriculis minutis) sagittatis; stylorum ramis apice truncatis vel conicis vel breviter caudato-appendiculatis. Achaenia obcompressa, orbiculata vel oblonga vel plus minusve

oblongo-linearia, saepe 2-alata alis membranaceis vel induratocrassatis integris vel fractis vel pectinato-dentatis planis vel incurvatis, glabra vel (marginibus praesertim) villosa, epapposa vel aristis lanceolatis linearibusve glabris erecto-hispidulisve vel 2 dentibus vel 2 paleis papposa (interdum medio apice poculo minuto coronata), numquam aristis retrorsum hamosis munita.

Type species: *Coreopsis lanceolata* L.

SECTIONES GENERIS

Sect. I. *Electra* (DC.) Blake, Proc. Amer. Acad. n. ser. 41: 337. 1913; pro genere DC. Prodr. 5: 630. 1836. Nos. 1–4. (This and the next four sections included by Blake under the subgenus *Leptosyne* [DC.] Blake, loc. cit. 336. 1913; pro genere DC. Prodr. 5: 531. 1836; etiam A. Gray, Proc. Amer. Acad. 17: 218. 1882; etiam A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 299. 1884; pro sect. *Coreopsidis* O. Hoffm. in Engler & Prantl, Nat. Pflanzenf. 4, pt. 5: 243. 1890 [exclud. *Epilepidem, Coreocarpum,* et *Acomam*].)

Suffruticosae, foliis oppositis, indivisis vel ternatim partitis, coriaceis, lamina segmentisve ovatis vel lanceolatis. Capitula solitaria vel paniculato-corymbosa. Involucri bracteae exteriores circ. 5, plus minusve oblongae; interiores circ. 8, longiores, plus minusve ovato-oblongae. Flores ligulati circ. 5, plerumque 2–3-dentati, ligula oblongi vel elliptici, fertiles, tubo pubescentes. Flores tubulosi limbo raro 4- plerumque 5-dentati, anulo deficiente, tubo pubescenti quam gutture cylindraceo-infundibuliformi breviore; styli ramis apice subulato-appendiculatis. Achaenia valde obcompressa, glabra, marginata, exteriora lata interiora multo angustiora, omnia epapposa vel interiora raro jugo aristarum glabrarum angustarum munita. Plantae mexicanae, centraliamericanae, et haitienses. (Type, *Electra mexicana* DC. =*Coreopsis mutica* var. *leptomera*.)

Sect. II. *Anathysana* Blake, op. cit. 339. Nos. 5–7.

Herbae perennes caulibus pluribus e radice lignea foliis oppositis integris vel pinnatiformibus lobis paucis filiformi-linearibus. Involucrum ut apud Sect. I sed interius 8–12-bracteatum. Flores ligulati fertiles. Flores tubulosi saepius exanulati; styli ramis apice incrassatis breviter appendiculatis. Achaenia ut apud Sect. I, epapposa. Plantae mexicanae (num. 7 ex insula Socorro). (Type, *Leptosyne mexicana* A. Gray=*Coreopsis cyclocarpa*.)

Sect. III. *Tuckermannia* (Nutt.) Blake, loc. cit. 340; pro genere, Nutt. Trans. Amer. Phil. Soc. ser. 2. 7: 363. 1841; pro sect. *Lep-*

tosynei, A. Gray, Bot. Calif. 1: 356. 1876; etiam Syn. Fl. N. Amer. 1, pt. 2: 300. 1884. Nos. 8 and 9.

Perennes, robustae, foliis alternis carnosis 2–3-pinnatim dissectis, capitulis magnis. Involucri bracteae subaequales, exteriores 5–8, lanceolato-oblongae; interiores circ. 12, oblongae. Flores ligulati magni, fertiles. Flores tubulosi anulo subglabro circumscripti. Achaenia obcompressa, glabra, anguste alata, epapposa vel raro marginibus in dentes breves vel aristas currentibus aegre papposa. Plantae e California, Baja-California, et proximis insulis Oceani Pacifici. (Type, *Tuckermannia maritima* Nutt.=*Coreopsis maritima*.)

Sect. IV. *Pugiopappus* (A. Gray) Blake, loc. cit.; *Agarista* DC. Prodr. 5: 569. 1836 (nec alior.); pro genere, A. Gray, Pacif. R. Rept. 4: 104. 1857; etiam Proc. Amer. Acad. 8: 659. 1873; pro sect. *Leptosynei* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 300. 1884. Nos. 10 and 11.

Annuae, e basi ramosae, foliis 2–3-pinnatfidis plerumque basalibus, capitulis mediocribus solitariis, pedunculis elongatis subnudis. Involucri bracteae exteriores 5–7, interiores circ. 8. Flores ligulati plerumque styliferi ac fertiles, interdum neutri vel cum stylis brevibus inclusis, ligula lati ac multistriati. Flores tubulosi anulati, anulo hirsuto. Achaenia dimorpha; radii epapposa, cortice marginata et ad facies quidem plus minusve costata; disci marginibus longe villosa, apice jugo aristarum lineari-lanceolatarum sursum setulosarum munita. Plantae Californiae australis. (Type, *Agarista Calliopsidea* DC.=*Coreopsis Calliopsidea*.)

Sect. V. *Euleptosyne* (A. Gray) Blake, op. cit. 341; pro sect. *Leptosynei* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 299. 1884. Nos. 12 and 13.

Habitu involucroque sect. *Pugiopappo* similis sed bracteis exterioribus linearis. Flores ligulati glabri, fertiles. Flores tubulosi anulati; styli ramis apice incrassatis, breviter appendiculatis. Achaenia phelloptera, apice poculo minuto coronata. Plantae Arizonae, Californiae, et Baja-Californiae borealis. (Type, *Leptosyne Douglasii* DC.=*Coreopsis Douglasii*.)

Sect. VI. *Pseudo-Agarista* A. Gray, Proc. Amer. Acad. 22: 428. 1861; *Epilepis* Benth. Pl. Hartweg. 17. 1839. Nos. 14–40.

Plus minusve fruticosae, foliis saepius decompositis segmentis angustis. Receptaculi paleae cum fructu saepe deciduae, ad hujus faciem exteriorem applicatae, apice saepius eroso-denticulatae. Flores tubulosi exanulati, styli ramis apice plus minusve conicis vel caudato-appendiculatis. Achaenia plus minusve lineari-oblonga,

exalata sed marginibus sursum villosa, apice biaristata aristis linearibus vel lanceolatis antrorsum hispidis. Plantae mexicanae et austro-americanae. (Type, *Coreopsis petrophila.*)

Sect. VII. *Eucoreopsis* Nutt. Trans. Amer. Phil. Soc. n. ser. 7: 357. 1841; *Coreopsoides* Moench, Meth. Pl. 594. 1794; *Anacis* Schrank, Denkschr. Akad. Münch. Math. Nat. 5: 5. 1817; *Leachia* Cass. Dict. Sci. Nat. 25: 388. 1822; *Chrysomelea* Tausch, Hort. Canal. 1823; *Chrysostemma* Less. Syn. Gen. Compos. 227. 1832; sect. *Chrysomelea* (Tausch) Nutt. loc. cit.; sect. *Gyrophyllum* Nutt. op. cit. 358; sect. *Leachia* (Cass.) A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 291. 1884. Nos. 41–91.

Herbae, foliis oppositis integris vel pinnatim partitis plerumque petiolatis. Ligulae plus minusve cuneatae, apice 3–5-lobatae vel -dentatae. Receptaculi paleae basi latae apicem versus attenuato-filiformes. Styli rami apice abrupte cuspidati vel conici. Achaenia fere orbiculata, ad maturitatem incurvata, nonnulla vel omnia demum papillata vel muriculata, saepe ventris apice basique callum (hoc quidem in unico capitulo saepe valde polymorphum) ferentia; pappo 2 dentibus minutis paleaceis vel deficiente. Plantae boreali-americanae et africanae, rarissime (*C. lanceolata*) in Asia. (Type, *Coreopsis coronata* Hook.=*Coreopsis nuecensis.*)

Sect. VIII. *Silphidium* Torr. & Gray ex A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 294. 1884; pro parte sect. *Eucoreopsidis* Torr. & Gray, Fl. N. Amer. 2: 341. 1843. No. 92.

Folia opposita, magna, indivisa, serrata. Ligulae integrae. Styli rami apice ovato-triangulati, breviter mucronati. Achaenia obovato-oblonga, exalata, apice obsolete bidentata. Plantae e Georgia ad Boreali-Carolinam. (Type, *Coreopsis latifolia.*)

Sect. IX. *Calliopsis* (Reichenb.) Nutt. Trans. Amer. Phil. Soc. n. ser. 7: 360. 1841; pro genere, Reichenb. Mag. Aesthet. Bot. No. 70. 1823; etiam DC. Prodr. 5: 568. 1836; *Diplosastera* Tausch, Hort. Canal. 1823; cf. Flora 1: 83. 1824; sect. *Coreoloma* (pro minima parte ex exemplo *C. Leavenworthii*) et subsect. *Calliopsidium* (omnino) Torr. & Gray, op. cit. 346. Nos. 93–100.

Herbae, foliis oppositis raro integris plerumque 1–2-pinnatim divisis lobis integris. Involucrum exterius parvum. Ligulae plerumque bicolores vel quidem rosaceae, apice dentatae. Styli rami apice truncati ac subpenicillati. Achaenia apice calva vel biaristata, alata vel exalata. Plantae boreali-americanae, rarissime ex aliqua parte (*C. lanceolata* et *C. tinctoria*) sinenses. (Type, *Calliopsis bicolor* Reichenb.=*Coreopsis tinctoria.*)

Sect. X. *Eublepharis* Nutt. Trans. Amer. Phil. Soc. n. ser. 7: 359. 1841; sect. *Rabdocaulis* Nutt. loc. cit.; sect. *Coreoloma* Torr. & Gray, Fl. N. Amer. 2: 346. 1843 (exclud. *C. Leavenworthii*); sect. *Cosmella* Torr. & Gray, op. cit. 348 (exclud. *C. roseam*). Nos. 101–111.

Herbae, foliis oppositis vel alternis, plerumque integris. Ligulae flavae vel rosaceae, dentatae. Flores disci atro-purpurei vel flavi. Styli rami truncati vel obtuse conici. Achaenia alata alis fimbriatis vel pectinato-dissectis. Plantae boreali-americanae praesertim e parte austro-orientali. (Type, *Coreopsis gladiata.*)

Sect. XI. *Euprestinaria* Schz. Bip. in Walp. Repert. 6: 163. 1846. Nos. 112–114.

Herbae annuae vel perennes. Florum tubulosorum tubus glaber, styli ramis apice cono hispido superatis. Achaeniorum oblongorum vel oblongo-lanceolatorum aristae paleaceae lanceolato-lineares utrinque ciliis adrectis hispidae. Plantae africanae praesertim abyssinicae. (Type, *Coreopsis Prestinaria.*)

CLAVIS

a. Plantae boreali-americanae antillanaeque.

b. Flores ligulati fertiles.

c. Herbae annuae.

d. Disci achaenia exaristata, phelloptera.

e. Achaenia setis clavellatis numerosis obsita. 12. *C. Douglasii.*

e. Achaenia non clavellato-setosa. . . . . 13. *C. Stillmanii.*

d. Disci achaenia biaristata, longe ciliata.

e. Involucri bracteae exteriores lineares. . 10. *C. Bigelovii.*

e. Involucri bracteae exteriores late ovatae. 11. *C. Calliopsidea.*

c. Herbae perennes vel frutices.

d. Folia simplicia vel ternatisecta, lamina vel foliolis subanguste lanceolatis vel latioribus.

e. Capitula numerosa cymoso-paniculata; foliis vel foliolis nunc plus minusve lanceolatis nunc oblongo-ovatis. 1. *C. mutica.*

e. Capitula pauca vel solitaria; foliis simplicibus.

f. Folia 2–6 cm. longa.

g. Folia cuneate oblanceolata vel obovata. 2. *C. cuneifolia.*

g. Folia anguste lanceolato-oblonga....4. *C. Buchii.*

f. Folia 1–2 cm. longa, ovalia.....3. *C. parvifolia.*

d. Folia vel segmenta linearia vel angustiora.

e. Folia integra vel raro lateraliter 2-lobata, 2–6 cm. longa. 5. *C. cyclocarpa.*

e. Folia principalia pinnatim lobata.

f. Flores ligulati usque ad 11 mm. longi.

g. Involucrum circ. 6–8 mm. altum, foliorum lobis lateralibus plerumque 3 jugis...6. *C. pinnatisecta.*

g. Involucrum circ. 4–5 mm. altum, foliorum lobis lateralibus saepius 1 jugo.....7. *C. insularis.*

f. Flores ligulati saltem 2 cm. longi.

g. Pedunculi dispersi, plerumque 1.5–4 dm. longi. 8. *C. maritima.*

g. Pedunculi corymbose congregati plerumque 1–2 (saepius usque ad 1.5) dm. longi..9. *C. gigantea.*

b. Flores ligulati steriles.

c. Fruticosae.

d. Achaenia glabra apice calva.....51. *C. cordylocarpa.*

d. Achaenia ciliata, biaristata.

e. Folia simplicia.....15. *C. petrophiloides.*

e. Folia 1–3-pinnatisecta.

f. Involucri bracteae interiores 5–6 mm. longae. 14. *C. petrophila.*

f. Involucri bracteae interiores 6–9 mm. longae.

g. Plantae glabrae vel foliis vix pilosiusculae.

h. Foliorum segmenta ultima 0.6–0.8 mm. lata; involucri bracteis exterioribus lineari-oblongis. 18. *C. Pringlei.*

h. Foliorum segmenta ultima 1–5 mm. lata; involucri bracteis exterioribus linearibus. 17. *C. rhyacophila.*

g. Plantae hispidae.....19. *C. rudis.*

c. Herbaceae.[1]

d. Stylorum rami termino acuti vel cuspidati.

[1] For convenience in making comparisons, the plants under *c* are keyed as closely as feasible according to the characters utilized by F. E Boynton in his treatment of the species of *Coreopsis* in the southeastern United States (J. K. Small, Fl. S. E. United States 1274. 1903).

e. Achaeniorum alae dissecte fimbriato-pectinatae. 101. *C. saxicola.*

e. Achaeniorum alae angustae vel latae, integrae (interdum fractae vel scissae) vel (*C. congregata*) supra quidem rotundo-lobatae sed numquam fimbriato-pectinatae.

f. Foliorum laminae vel segmenta margine integra.

g. Stylorum rami termino cuspidati; paleis basi latis superne attenuato-filiformibus; foliorum laminis simplicibus vel pinnatim lobatis.

h. Perennes; ligulis omnino flavis.

i. Achaenia alata alis patulis vel minime incurvatis.

j. Achaeniorum corpora (alis exclusis) circ. 2 mm. longa et circ. 1 mm. lata. 43. *C. debilis.*

j. Achaeniorum corpora (alis exclusis) 2.5–3.2 mm. longa et saltem 1.4–2 mm. lata.

k. Caules basim versus foliosi, gerentes ramos longos nudos pedunculoideos.

l. Involucri bracteae exteriores angustissime lineares, 5–11 mm. longae. 46. *C. heterolepis.*

l. Involucri bracteae exteriores lanceolatae vel oblongo-lineares vel oblongo-ovatae, 3–8 mm. longae.

m. Folia petiolis inclusis plerumque 3–8 cm. longa, involucri bracteis exterioribus 3–5 mm. longis. 42. *C. corninsularis.*

m. Folia petiolis inclusis plerumque usque ad 1.5 dm. longis, involucri bracteis exterioribus 4–8 mm. longis. 41. *C. lanceolata.*

k. Caules fere usque ad summam foliosi; pedunculis moderate brevibus.

l. Foliorum laminae latae, simplices vel lateraliter 1–5-lobatae.

m. Involucri bracteae subaequales 7–10 mm. longae.....45. *C. pubescens.*

m. Involucri bracteae exteriores 4–7 (raro –8) mm. interiores 12–14 mm. longae.....44. *C. intermedia.*

l. Foliorum laminae in segmenta angusta pinnatim partitae...47. *C. grandiflora.*

i. Achaenia alata alis valde incurvatis integris demum calloso-incrassatis...48. *C. auriculata.*

h. Annuae.

i. Ligulae discolores.....50. *C. nuecensis.*

i. Ligulae omnino flavae.....49. *C. congregata.*

g. Stylorum rami termino acute conici; paleis linearibus vel termino vix dilatatis; foliorum laminis plerumque palmato-lobatis vel -divisis (pro *C. majore* var. *Oemleri* simplicibus).

h. Foliorum laminae petiolatae....91. *C. tripteris.*

h. Foliorum laminae sessiles.

i. Foliorum laminae infra medium non vel parce sectae.....86. *C. palmata.*

i. Foliorum laminae usque ad basim partitae.

j. Flores tubulosi corollis flavi.

k. Foliorum segmenta filiformia vel linearifiliformia 0.3–1 mm. lata.
87. *C. verticillata.*

k. Foliorum segmenta latiora...90. *C. major.*

j. Flores tubulosi corollis purpureo-brunnei.

k. Foliorum principalium segmenta pauca, plerumque 1.5–3.5 mm. lata; internodiis quam foliis saepius longioribus.
89. *C. Delphinifolia.*

k. Foliorum principalium segmenta numerosa, 0.5–1.5 mm. latis; internodiis quam foliis plerumque brevioribus.
88. *C. pulchra.*

f. Foliorum laminae regulariter dentatae.
92. *C. latifolia.*

d. Stylorum rami termino truncati vel obtuse conici.

e. Achaenia exalata.

f. Ligulae basi rubro-brunneae alibi flavae; disci floribus corolla atro-rubris.

g. Involucri bracteae exteriores quam interiores multo breviores; achaeniis anguste oblongis, tenuibus, subplanis.....93. *C. tinctoria.*

g. Involucri bracteae exteriores quam interiores non plerumque breviores; achaenia obovata, crassa, convexa.....94. *C. basalis.*

f. Ligulae roseae; disci floribus corolla flavis. 95. *C. rosea.*

e. Achaenia alata.

f. Achaeniorum alae integrae.

g. Achaenia apice calva vel minute dentata.

h. Ligulae discolores.

i. Achaenia circ. 2 mm. longa, anguste vel late alata.....96. *C. Cardaminefolia.*

i. Achaenia 2.4–2.8 mm. longa, angustissime alata (vel interdum tantum marginata). 99. *C. Atkinsoniana.*

h. Ligulae omnino flavae.....97. *C. stenophylla.*

g. Achaenia perspicue aristata aristis interdum in maturitate deciduis.

h. Ligulae discolores (specie texana)..98. *C. similis.*

h. Ligulae omnino flavae (specie floridana). 100. *C. Leavenworthii.*

f. Achaeniorum alae dissecte fimbriato-pectinatae.

g. Folia non juncoidea; ligulis flavis.

h. Foliorum majorum laminae plus minusve oblongae vel lanceolatae.

i. Folia inferiora quam internodia breviora vel paulo longiora, opposita...103. *C. Linifolia.*

i. Folia inferiora quam internodia multo longiora.

j. Foliorum imorum laminae lineares vel lanceolatae, apice plerumque mucronatae.

k. Foliorum laminae simplices integraeque; achaeniis elliptico-oblongis, circ. 4 mm. longis, ala quam corpore multo angustiore.....104. *C. longifolia.*

k. Foliorum laminae saepe lobatae; achaeniis anguste oblongis, circ. 5 mm. longis, ala corpori latitudine aequali. 105. *C. falcata.*

j. Foliorum imorum laminae oblongae vel ellipticae, apice obtusae...106. *C. gladiata.*

h. Foliorum majorum laminae plus minusve ovatae.

i. Folia opposita; petiolis (ac laminis juvenilibus) ciliatis.....108. *C. integrifolia.*

i. Folia alterna; petiolis (ac laminis quidem juvenilibus) eciliatis...107. *C. Helianthoides.*

g. Folia juncoidea, laminis veris deficientibus; ligulis rosaceis.....109. *C. nudata.*

a. Plantae austro-americanae.

b. Folia indivisa.

c. Folia 0.5–2 cm. lata.

d. Folia oblanceolata, 0.5–1.5 cm. lata.

e. Folia integra, 5–7.5 mm. lata.....25. *C. oblanceolata.*

e. Folia supra medium acriter paucidentata, 0.8–1.5 cm. lata.....25*a*. *C. Woytkowskii.*

d. Folia anguste ovato-lanceolata, 1–2 cm. lata. 16. *C. Irmscheriana.*

c. Folia angustiora.

d. Folia lineari-flagellaria tantum 0.5–1 mm. lata, totam longitudinem aequaliter angusta.....26. *C. longula.*

d. Folia angustissime spathulato-linearia, 1–2 mm. lata. 27. *C. venusta.*

b. Folia divisa.

c. Folia primaria minuta, tantum 7–9.5 mm. longa.

d. Folia cum fasciculis axillaribus, quam internodia plerumque paulo brevioria; involucri bracteis exterioribus biserialibus circ. 18.....29. *C. senaria.*

d. Folia sine fasciculis axillaribus, quam internodia saltem duplo longiora; involucri bracteis exterioribus uniserialibus circ. 8.....28. *C. nodosa.*

c. Folia primaria majora.

d. Capitula pansa ad anthesin circ. 1.1–2 cm. lata; foliorum laminis vel segmentis 1.5–4 mm. latis.

e. Partes novellae glaucescentes; involucri bracteis exterioribus linearibus quam interioribus dimidio brevioribus.....20. *C. glaucodes.*

e. Nullae partes glaucescentes.

f. Involucri bracteae exteriores minutae, longitudine tantum circa tertiae interiorum.

g. Involucri bracteae exteriores ovatae; foliorum segmentis lateralibus cuneatis vel elliptico-obovatis vel spathulatis, 2–6 mm. latis. . .21. *C. microlepis.*

g. Involucri bracteae exteriores lineari-oblongae; foliorum segmentis lateralibus anguste linearibus, 1–1.7 mm. latis.....22. *C. Macbridei.*

f. Involucri bracteae exteriores lineari-oblongae, quam interiores dimidio breviores.....24. *C. parviceps.*

d. Capitula pansa ad anthesin 2.2–5 cm. lata.

e. Folia densissime congregata, ramis fere abditis.

f. Foliorum segmenta lineari-oblanceolata, apicaliter subobtusa; involucri bracteis exterioribus circ. 8, oblongis, apice rotundatis, circ. 5 mm. longis et 1.5 mm. latis, uniseriatim dispositis. .30. *C. foliosa.*

f. Foliorum segmenta lineari-subulata, apicaliter acuta; involucri bracteis exterioribus circ. 11, ovatis, circ. 6 mm. longis et 3.3–4.8 mm. latis, biseriatim dispositis.....31. *C. polyactis.*

e. Folia plerumque laxius (*C. trilobae* interdum dense) disposita, ramis plus minusve manifestis.

f. Foliorum segmenta ultima lanceolata vel oblonga; involucri 6 bracteis exterioribus 2–3 mm. longis et 1–1.6 mm. latis.....32. *C. notha.*

f. Foliorum segmenta ultima angustiora.

g. Foliorum triloborum segmenta ultima flagellaria, apicaliter acuta, 1–3.5 cm. longa et plerumque 0.3–0.6 mm. lata.

h. Folia laxissime patentia vel etiam subreflexa. 33. *C. capillacea.*

h. Folia dense adgregata, suberecta. .34. *C. triloba.*

g. Foliorum segmenta ultima diversa.

h. Involucra glaberrima.....35. *C. spectabilis.*

h. Involucra (saltem infra) hispida.

i. Rami foliaque hinc illinc resinosa, suaveolentia. 36. *C. suaveolens.*

i. Rami foliaque diversa (petiolis raro inferne resinosis).

j. Involucri bracteae exteriores biseriales, circ. 16.....38. *C. imbricata.*

j. Involucri bracteae exteriores uniseriales, multo pauciores.

k. Foliorum primariorum multa 2.5–4.5 cm. longa.

l. Achaenia villoso-ciliata dorso sub palea glabra sed ad ventrem villosissima. 37. *C. Pickeringii.*

l. Achaenia villoso-ciliata sed faciebus glabra.....39. *C. Townsendii.*

k. Folia primaria 1–2.5 cm. longa.

l. Internodia superiora multo folia superantia, ligulis siccis brunneo-flavis. 23. *C. Killipii.*

l. Internodia superiora non vel moderate folia superantia, ligulis siccis claro- vel subclaro-flavis.....40. *C. fasciculata.*

a. Plantae africanae.

b. Achaenia valde obcompressa, marginibus saepissime tenuia alatave.

c. Aristae achaeniorum filiformes ac corporibus breviores, vel deficientes.

d. Plantae annuae (vel verisimiliter annuae).

e. Folia superne hispida.

f. Achaenia (alis inclusis) circ. 2–3.5 mm. lata.

g. Involucri bracteae exteriores 6–11 mm. longae.

h. Flores ligulati circ. 2.5–3 cm. longi. 76. *C. oligoflora* (vide etiam 72. *C. multifloram*).

h. Flores ligulati circ. 1–2 cm. longi...79. *C. vulgaris.*

g. Involucri bracteae exteriores 3–6 mm. longae.

h. Capitula numerosa, ad anthesin circ. 2.5–3.3 cm. lata, demum cum achaeniis maturis ±1.2 cm. alta et plerumque paulo angustiora, achaeniorum corporibus plerumque 7–10 mm. longis, aristis perspicue densissimeque erecto-hispidis supra paleas valde manifestis. 80. *C. Giorgii* (vide etiam 78. *C. Goffardii*).

h. Capitula pauca, ad anthesin ±4 cm. lata, demum cum achaeniis maturis sub 1 cm. alta et ±1.3 cm. lata, achaeniorum corporibus 3.5–6 mm. longis, aristis minutissimis ac non supra paleas manifestis.....77. *C. Quarrei.*

h. Capitula subnumerosa, ad anthesin circ. 4–4.5 cm. lata, demum cum achaeniis maturis circ. 1 cm. alta et parce latiora, achaeniorum corporibus 4.5–6.5 mm. longis, aristis in paleis subabditis.....82. *C. injucunda.*

f. Achaenia (alis inclusis) 4–5 mm. lata. 81. *C. Mattfeldii.*

e. Folia superne glabra vel glabrata.

f. Achaenia exaristata.....56. *C. Negriana.*

f. Achaenia biaristata.

g. Foliorum caulinorum saepius 2–3-pinnatisectorum segmenta anguste linearia; capitulis pansis ad anthesin 2.5–5 cm. latis.

h. Foliorum segmenta plerumque circ. 1 mm. lata; involucro hispido.....71. *C. leptoglossa.*

h. Foliorum segmenta plerumque 2–4 mm. lata; involucro glabrato vel subglabrato. 69. *C. Feruloides.*

g. Foliorum 2-pinnatisectorum segmenta principalia oblongo-lanceolata; capitulis pansis ad anthesin 2.5–4 cm. latis. 61. *C. Prestinariaeformis* var. *β incisa.*

g. Foliorum caulinorum indivisorum laminae vel 3–5-partitorum segmenta late linearia; capitulis pansis ad anthesin 5–7 cm. latis.....83. *C. Borianiana.*

g. Foliorum 3–5-lobatorum foliola ovata vel ovato-sublanceolata.....61. *C. Prestinariaeformis.*

d. Plantae perennes (vel verisimiliter perennes).

e. Foliorum principalium laminae vel segmenta lanceolata vel latiora.

f. Foliorum segmenta dentata dentibus perspicue elongatis (saepe 1–1.5 cm. longis)...110. *C. Mildbraedii.*

f. Foliorum laminae vel segmenta diversa.

g. Folia indivisa.

h. Folia scabra, saepius 10–16 cm. longa; involucro hispido.....85. *C. scabrifolia.*

h. Folia glabra, 1.5–5 cm. longa; involucro glabro. 62. *C. Barteri.*

g. Folia divisa.

h. Achaenia exaristata.

i. Folia plerumque pinnata vel pinnatifida segmentis principalibus saepius late oblongo-lanceolatis vel ovatis, inter se saepe propinquis, supra scaberulis subtus tomentellis.

j. Caulis primo tomentellus mox glabratus. 66. *C. Whytei.*

j. Caulis perpetuo tomentellus. 65. *C. pinnatipartita.*

i. Folia 2–3-pinnatisecta, foliolis vel segmentis principalibus saepius anguste oblongo-lanceolatis, glabris.....67. *C. Lupulina.*

h. Achaenia biaristata.

i. Capitula pansa ad anthesin 5.5–9 cm. lata.

j. Folia pubescentia.

73. *C. bella* (vide etiam..72. *C. multifloram*).

j. Folia faciebus glabra.....84. *C. togensis.*

i. Capitula pansa ad anthesin usque ad 4 cm. lata.

j. Folia molliter denseque pubescentia; achaeniis plumbeo-nigris minutis corpore tantum 3–4 mm. longis.....68. *C. Neumannii.*

j. Folia glabra vel subglabra.

k. Pauca folia divisa.....62. *C. Barteri.*

k. Folia plerumque divisa.

l. Involucrum moderate vel valde hispidum.

m. Involucrum moderate adpresso-hispidum; pedunculo tenui glabratoque; floribus tubulosis extrinsecus glabris.....75. *C. exilis.*

m. Involucrum valde hispidum; pedunculo subrobusto hispidoque; floribus tubulosis inferne pilosis. 64. *C. oblonga.*

l. Involucrum non nisi basi hispidum.

m. Caulis rigidus superne circ. 2.5–3.5 mm. crassus, foliis principalibus petiolo adjecto circ. 4–5 cm. longis, capitulis pansis 4–5.5 cm. latis, planta kamerunensi. 63. *C. monticola.*

m. Caulis gracilis superne 1–2 mm. crassus, foliis principalibus petiolo adjecto 5–8 cm. longis, capitulis pansis 3–3.5 cm. latis, planta angolensi.....74. *C. Curtisii.*

e. Foliorum principalium laminae vel segmenta late vel anguste linearia.

f. Foliorum dentes saepe in setas elongatas desinentes; lamina indivisa, usque ad 2 dm. longa et 4–10 mm. lata.....111. *C. bracteosa.*

f. Foliorum dentes non setigerae.

g. Folia inferiora 1–2 dm. longa; involucri bracteae exteriores circ. 12, lineari-subulatae, 1–1.5 cm. longae.....57. *C. camporum.*

g. Folia inferiora raro 1 dm. longa.

h. Frutices.

i. Achaenia exaristata.

j. Segmenta ultima 2–3 mm. lata. 52. *C. elgonensis.*

j. Segmenta ultima multo angustiora. 53. *C. Chippii.*

i. Achaenia biaristata.....54. *C. scopulorum.*

h. Herbae.

i. Capitula pansa ad anthesin 4–8.5 cm. lata.

j. Involucri bracteae exteriores elongatae, lateraliter lobatae; ligulis sulphureis. 58. *C. Ellenbeckii.*

j. Involucri bracteae exteriores normales; ligulis aurantiacis.....70. *C. ochracea.*

i. Capitula pansa ad anthesin circ. 2–2.5 cm. lata.

j. Folia atro-viridia, segmentis plerumque 1.2–2.5 mm. latis.....59. *C. lineariloba.*

j. Folia pallida, segmentis plerumque circ. 1 (raro 2) cm. latis.....60. *C. Schimperi.*

c. Aristae achaeniorum subulatae.

d. Herbae annuae.

e. Involucri bracteae interiores glabrae. 112. *C. Prestinaria.*

e. Involucri bracteae interiores pilis subplanis obtectae. 61. *C. Prestinariaeformis* et var. *β incisa.*

d. Herbae perennes..... 113. *C. macrantha.*

b. Achaenia tantum moderate vel aegre obcompressa.

c. Achaenia exaristata; foliis indivisis spathulato-oblanceolatis· 55. *C. Jacksonii·*

c. Achaenia biaristata aristis lanceolato-subulatis; foliis bipinnatipartitis..... 114. *C. pachyloma* et var. *β inanis.*

ABBREVIATIONS USED FOR HERBARIA CITED

Berl.	Herb. Berlin Botanical Garden, Berlin-Dahlem.
Boiss.	Herb. Boissier, Geneva.
Brit.	Herb. British Museum of Natural History, South Kensington.
Bruss.	Herb. National Botanical Garden, Brussels.
Calif.	Herb. University of California, Berkeley.
Del.	Herb. Delessert, Geneva.
Field	Herb. Field Museum of Natural History, Chicago.
Flor.	Herb. Institute of Botany, University of Florence, Italy.
Gray	Herb. Gray, Harvard University, Cambridge, Massachusetts.
Hamb.	Herb. Hamburg Botanical Garden, Germany.
Kew	Herb. Royal Botanic Gardens, Kew.
Linn.	Herb. Linnaeus, Linnaean Society, London.
Mo.	Herb. Missouri Botanical Garden, St. Louis.
Mun.	Herb. Munich Botanical Garden, Germany.
Mus. Cong.	Herb. Musei Congoensis, Tervueren, Belgium. (Recently merged with the Herbarium of the National Botanical Garden, Brussels.)
Mus. V.	Herb. Museum of Natural History, Vienna.
N. Eng.	Herb. New England Botanical Club, Cambridge, Massachusetts.
N. Y.	Herb. New York Botanical Garden, New York City.

Oxf.	Herb. University of Oxford, Oxford.
Par.	Herb. Museum of Natural History, Paris.
Phila.	Herb. Philadelphia Academy of Natural Sciences, Philadelphia.
Pom.	Herb. Pomona College, Claremont, California.
Stanf.	Herb. Stanford University, California.
Stockh.	Herb. National Natural History Museum, Stockholm.
U. S.	Herb. United States National Museum, Washington.
U. V.	Herb. University of Vienna, Austria.

1. **Coreopsis mutica** DC. Prodr. 5: 571. 1836. *Electra Galeottii* A. Gray, Pl. Wright. 110. 1852. *C. Galeottii* (A. Gray) Hemsl. Biol. Centr. Amer. Bot. 2: 195. 1881. *C. mutica* var. *genuina* Blake, Proc. Amer. Acad. 52: 55. 1917.

Foliorum segmenta vel laminae tenuiter lanceolatae vel etiam linearilanceolatae ..... var. γ *leptomera.*

Foliorum segmenta vel laminae latiores.

Folia petiolis adjectis tantum circ. 2.5–4 cm. longa.

var. δ *holotricha.*

Folia 4–17 cm. longa.

Folia utrinque glabrata ..... *C. mutica* sensu stricto.

Folia infra dense pubescentia ..... var. β *subvillosa.*

Fruticosa, plus minusve glabra, 0.3–1.3 (etiam usque ad 2) m. alta. Folia petiolata petiolis anguste alatis 0.6–3 cm. longis, petiolo adjecto 4–17 cm. longa, simplicia vel trisecta vel saepe tripartita, lamina segmentisve oblonge lato-lanceolatis vel lanceolato-ovatis (terminali apice saepe acuminato) utrinque glabratis vel inferne praecipue ad venas sparsim hispidis, acriter serratis, superne saepe subcoriaceis. Capitula paniculato-corymbosa, nunc pauca (5–15 pro unica inflorescentia) nunc numerosa (usque ad circ. 60), tenuiter pedicellata pedicellis saepe glabris 1–4 cm. longis, radiata, pansa ad anthesin 2–5 cm. lata et 8–17 mm. alta. Involucrum saepe glaberrimum, bracteis exterioribus circ. 5, nunc oblongis nunc late angusteve spathulato-oblanceolatis, apice plus minusve mucronatis, 5–12 mm. longis, quam interioribus ovato-oblongis vel rotundato-ovatis demum saepe dimidio brevioribus. Flores ligulati circ. 5, lutei, fertiles, ligula oblongi, tubo pilosi, apice 2–4-denticulati, 1–2 cm. longi. Paleae glabrae, oblongo-lineares. Florum tubulosorum

stylorum rami apice subulati hispidique. Achaenia valde obcompressa, corpore nigra alis stramineo-brunnea, exteriora late oblanceolata alia angustiora, glaberrima, 6–13 mm. longa et 1–3 mm. lata, apice emarginato calva vel interiora rarissime biaristata.

Type specimen: Collected by *F. W. Keerl* at Tlapujahua (Tlapacoya), northern Puebla, Mexico (Bruss.). DeCandolle cited Martius' herbarium for his type specimen, but a good-sized and representative fragment is in DeCandolle's Prodromus Herbarium (Del.).

Distribution: State of Hidalgo, Mexico, southeastwardly through Oaxaca and Chiapas into Guatemala.

Specimens examined: *Baites*, Mexico, 1864 (Gray); *Gust. Bernoulli 196*, in thickets, Baño de los Padres, Guatemala, November, 1865 (N.Y.); *Cassiano Conzattii 1431*, alt. 1,650 meters, Cerro San Antonio, State of Oaxaca, Mexico, June 26, 1906 (Gray); *Ehrenberg 354* pro parte, Mexico (Pom.); *Galeotti 2086*, Cordilleras of Mexico (Gray, fragment; one of two types of *Electra Galeottii* A. Gray); *Ghiesbreght 133*, State of Chiapas, Mexico (Gray); *idem 539*, growing 5–6 ft., cold and temperate region, November, 1864–1870 (Gray; Mo.); *Sutton Hayes*, large shrub, near Amatitlán, Department of Amatitlán, Guatemala, July 20, 1860 (Gray); *Heyde & Lux 3792*, alt. 2,400 meters, Laguna de Ayarza, Department of Jalapa, Guatemala, 1892 (Berl.; Gray; N.Y.); *E. W. D. Holway 5*, alt. 1,500 meters, Guatemala City, Guatemala, January 1, 1915 (Gray); *idem 52*, alt. 2,100 meters, San Rafael, Department of Guatemala, Guatemala, January 9, 1915 (Gray); *idem 154*, alt. about 1,950 meters, Sololá, Guatemala, January 30, 1915 (Gray); *idem 613*, Guatemala City, December 21, 1916 (Gray); *W. A. Kellerman 6296*, alt. 1,465 meters, San Rafael, Department of Guatemala, Guatemala, February 3, 1907 (Field); *C. G. Pringle 8218*, alt. 2,850 meters, Sierra de Pachuca, State of Hidalgo, Mexico, September 14, 1899 (Berl.; Field; Gray; Mo.; N.Y.; Pom.); *idem 13041*, alt. 2,490 meters, dry, calcareous bluffs near Metepec Station, State of Hidalgo, September 20, 1904 (Berl.; Field; Gray); *C. A. Purpus 1550*, sunny, rocky slopes, Pachuca, State of Hidalgo, September, 1905 (Field; Gray; Mo.; N.Y.); *J. N. Rose, J. H. Painter, & J. S. Rose 8837*, near Tulancingo, State of Hidalgo, July 22, 1905 (Gray; Mo.; N.Y.; U.S.); *Osbert Salvin*, alt. 1,590 meters, Volcán del Fuego, Guatemala, August, 1873 (Berl.); *H. Von Tuerckheim II. 2043*, alt. 1,400 meters, San Cristóbal, Department of Alta Verapaz, Guatemala, December, 1907 (Field, 2 sheets; Gray; Mo.; N.Y.).

Gray wrote, concerning material referred here to this one species (Pl. Wright. 110. 1852): "We appear to have two species, which, however, are not as well marked as could be desired, viz.: 1. *Electra Mexicana*.....2. *E. Galeottii.*" Gray's use of "foliis lato-lanceolatis" for *Electra mexicana* indicates that he mistook simple, broad-leaved forms of *Coreopsis mutica* (*E. Galeottii*) for DeCandolle's *Electra mexicana*, which latter had narrow leaves and would best be designated today as a variety (vide *C. mutica* var. γ *leptomera*, infra).

Coreopsis mutica var. β **subvillosa** DC. Prodr. 5: 571. 1836. *C. mexicana* var. *hyperdasya* Blake, Proc. Amer. Acad. 49: 338. 1913.

Folia infra ubique dense pubescentia, supra venis exceptis glabrata vel scabriuscula, caulibus et gemmis et inflorescentia piloso-tomentosis lente subglabratis.

Type specimen: Collected by *Wilhelm Friedrich von Karwinski* in Mexico (Mun.).

Distribution: State of Hidalgo and southeastwardly through Puebla into State of Oaxaca, Mexico.

Specimens examined: *C. Conzatti 1955*, alt. 1,700 meters, Alturas de San Pablo Hintzo, State of Oaxaca, August 25, 1907 (Field); *idem 2074*, alt. 1,900 meters, Las Sedas, State of Oaxaca, October 20, 1907 (Field); *idem & V. González 545* et *546*, alt. 2,000 meters, Cerro de San Felipe, State of Oaxaca, September 1, 1897 (Gray); *Ehrenberg 354* pro parte, between Mineral del Monte and Pachuca, State of Hidalgo (Berl., 2 sheets); *E. W. Nelson 1718*, alt. 1,800–2,250 meters, near Reyes, State of Oaxaca, October 17, 1894 (Gray); *Nicolás*, State of Puebla, October, 1905 (Field); *C. G. Pringle 4896*, alt. 1,800 meters, ravines of hills near City of Oaxaca, State of Oaxaca, September, 1894 (Field; Gray, 2 sheets; Mo.; N.Y.; Pom.; U.S.); *Charles L. Smith*, alt. 2,100–2,400 meters, Sierra de San Felipe, State of Oaxaca, October 11, 1894 (Mo.; N.Y.); *Lucius C. Smith 25*, San Juan del Estado, State of Oaxaca, June 18, 1894 (Gray); *idem 808*, alt. 2,130 meters, La Carbonera, State of Oaxaca, September 20, 1895 (Gray).

Coreopsis mutica var. γ **leptomera** Sherff, Bot. Gaz. 88: 300. 1929. *Electra mexicana* DC. Prodr. 5: 630. 1836. *C. mexicana* (DC.) Hemsl. Biol. Centr. Amer. Bot. 2: 196. 1881. *C. chrysantha* Sessé & Moc. Fl. Mex. ed. 2. 194. 1894 (non alior.). *Silphium ternatum* Sessé & Moc. op. cit., 195.

Glabrata; e specie foliorum glabrorum laminis vel segmentis tenuiter lanceolatis vel etiam lineari-lanceolatis differt.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 9895, at altitude of 2,040 meters, clay banks, Dublán, State of Hidalgo, Mexico, October 15, 1902 (Field).

Distribution: State of Guanajuato eastwardly through Querétaro into State of Hidalgo and thence southward into Federal District, Mexico.

Specimens examined: commun. *Alfredo Dugès* sub num. *472*, Guanajuato, State of Guanajuato, 1895 (Gray); *Hort. Hulier 8*, December 5, 1866 and *101*, January 9, 1867 (N.Y.); *Méndez*, about Villalpando beyond City of Guanajuato, State of Guanajuato (Gray; cotype of *Electra mexicana* DC.); *Pringle 9895* (type, Field; cotypes, Berl.; Gray; Mo.; N.Y.; U.S.); *idem 13547*, growing 5 to 6 feet high at alt. 2,550 meters, barranca above Santa Fe, Federal District, September 1, 1905 (U.S.); *C. A. Purpus 1339*, Ixmiquilpán, State of Hidalgo, September, 1908 (Berl.); *J. N. Rose, J. H. Painter, & J. S. Rose 9717*, near Cadereyta, State of Querétaro, August 22, 1905 (Gray; N.Y.; U.S.); *Uhde 627*, Mexico.

DeCandolle's *Electra mexicana* came from Villalpando, near the City of Guanajuato, and was a form with simple, narrow leaf blades. The specimen sent by Dugès from the same general locality had mainly tripartite leaves, a distinction of no diagnostic value in this species, and, what was indeed significant, the segments were likewise narrow. A study of these and other collections shows that the form with narrow leaf blades or leaflets constitutes a rather well-marked variety occupying a range of greater western but lesser southern extent than does the species proper.

Coreopsis mutica var. δ **holotricha** Blake, Proc. Amer. Acad. 52: 55. 1917. *C. mexicana* var. *hyperdasya* f. *holotricha* Blake, op. cit. 49: 338. 1913.

Folia parva circ. 2.5–4 cm. longa, utrinque cinerea pube densa subscabra.

Type specimen: Collected by *Carl Albert Purpus*, No. 3099, vicinity of San Luis Tultitlanapa, State of Puebla, Mexico (Gray).

Distribution: Known only from type locality in State of Puebla, Mexico.

Specimens examined: *Purpus 3099* (type, Gray; cotypes, Berl.; Field; Mo.; U.S.).

2. **Coreopsis cuneifolia** Greenm., Proc. Amer. Acad. 40: 43. 1904.

Fruticosa, verisimiliter 5–9 dm. alta, caulibus rubris griseisve aegre angulatis, ramulis primo antrorsum subadpresso-pubescentibus demum nodis exceptis glabratis. Folia sessilia vel subpetiolata, simplicia, cuneata vel oblanceolato-cuneata, dimidio superiore dentibus patentibus mucronatisque paucidentata, infra medium sensim cuneateque usque ad basim angustata, utrinque glabra vel infra parce pubescentia, glandulo-punctata, 1.5–5 cm. longa et 0.6–2 cm. lata. Capitula solitaria vel paniculato-cymosa pedunculis tenuibus saepe 1–2 dm. longis, radiata, pansa ad anthesin 1–2.5 cm. lata et 8–11 mm. alta. Involucri glabri bracteae exteriores circ. 5, lineari-oblongi, adpressae vel parce patentes, 2–5 mm. longae; interiores oblongo-ovatae, 5–8 mm. longae. Flores ligulati 5 vel 6, fertiles, flavi, ligula late oblongi vel cuneato-obcordati, apice nunc vix nunc profunde dentati, 0.6–1.3 cm. longi, tubo brevi parce pubescenti. Paleae glabrae, apice obtusae. Florum tubulosorum (circ. 12) stylorum rami terminaliter angustato-appendiculati. Achaenia valde obcompressa, circumambitu naviculoidea, glaberrima, 7–10 mm. longa et 3–4 mm. lata, fusca vel alis viridi-brunnea, nitida, apice emarginato calva.

Type specimen: Collected by *Joseph Nelson Rose*, No. 2344, State of Durango, Mexico, August 16, 1897 (Gray).

Distribution: State of Durango southward into State of Jalisco, Mexico.

Specimens examined: *C. R. Barnes & W. J. G. Land 165*, alt. 1,680 meters, Sierra de San Esteban, State of Jalisco, September 28, 1908 (Field); *iidem 313*, alt. 1,800 meters, dry hills along road to Santo Domingo Mine, Etzatlán, State of Jalisco, October 6, 1908 (Berl.; Field); *C. G. Pringle 8781*, dry, rocky mountains above Etzatlán, State of Jalisco, October 2, 1903 (Field; Gray; N.Y.); *idem 11900*, alt. 1,800 meters, Sierra de San Esteban, near Guadalajara, State of Jalisco, October 21, 1903 (Berl.; Field; Gray); *Rose 2344* (type, Gray; cotype, U.S.).

3. **Coreopsis parvifolia** Blake, Proc. Amer. Acad. 49: 338. 1913.

Fruticosa, juventate adpresse pubescens denique glabrata, verisimiliter 5–9 dm. alta. Folia subpetiolata, rigida, parva, tantum circ. 1–2 cm. longa, ovalia, supra adpresse pubescentia infra paulum crinita vel glabrata, supra partem inferiorem integram late cuneatam utroque circ. 5-mucronato-dentata, summa imminuta subintegra. Capitula solitaria ramos elongatos superne subnudos terminantia, radiata, pansa ad anthesin 2.5–3 cm. lata et 1–1.5 cm. alta. Involu-

cri bracteae exteriores circ. 5, subcrinitae, oblongo-spathulatae, obtusae, 4–6 mm. longae; interiores oblongo-ovatae, obtusae, apice fimbriatae, 8–11 mm. longae. Flores ligulati circ. 5, lutei, ligula ovales vel oblongi, apice denticulati, circ. 1.2–1.5 cm. longi. Paleae lineari-oblongae, nitidae. Flores tubulosi 4-dentati, stylorum ramis apice tenuiter hispido-caudatis. Achaenia immatura plana, oblanceolata, nitida, alato-marginata, glaberrima, apice calvo emarginata, 8 mm. longa et 2.2 mm. lata.

Type specimen: Collected by *Carl Albert Purpus*, No. 2581, on dry, rocky hillsides, Esperanza, State of Puebla, Mexico, August, 1907 (Gray).

Distribution: Known only from type locality in State of Puebla, Mexico.

Specimens examined: *Purpus 2581* (type, Gray; cotypes, Field; U.S.); *idem 2581a*, eodem loco, October, 1911 (Berl.).

4. **Coreopsis Buchii** (Urb.) Blake, Contr. U. S. Nat. Herb. 22: 641. 1924. *Selleophytum Buchii* Urb. in Fedde, Repert. Sp. Nov. 13: 484. 1914.

Fruticosa, erecta, glabra, 3–10 dm. alta, ramis teretibus obscure brunneo-rubris plus minusve pruinatis, internodiis 2–4 cm. longis. Folia opposita, sessilia, 4–7 cm. longa et 1–1.5 cm. lata, anguste lanceolato-oblonga, glabra, subcoriacea, pallide viridia, subnitida, margine integra sed interdum aegerrime undulata, basi lata leviter cordata, supra medium sensim angustata, apice acuta, nervo medio supra prominente, lateralibus utroque latere 12–16, minoribus intermixtis, utrinque reticulato-conjunctis et prominentibus. Capitula pauca (solitaria vel terna umbellata), radiata, recte pedunculata pedunculis circ. 4–6 cm. longis, in juventute globosa nigrescentiaque, fructifera circ. 2 cm. lata et circ. 1.5 cm. longa. Involucri glabrati bracteae exteriores 4–5, laxe accumbentes, subcoriaceae, e basi circ. 2–2.5 mm. lata sensim angustatae, apice indurato subacutae, tergo tenuiter vel obsolete 3–5-nervatae, circ. 8–10 mm. longae; interiores lanceolato-oblongae, inferne coriaceae superne tenuiores, circ. 12–13 mm. longae et circ. 3–4 mm. latae, apice obtusiusculae. Flores ligulati flavi, tubo 2.5 mm. longi et (extrinsecus) pilosuli, limbo 8 mm. lati (apice non viso) tergo breviter pilosi. Paleae apice acuminatae, pleraeque 3-nervatae, circ. 11–12 mm. longae et circ. 1–1.5 mm. latae. Achaenia oblongo-linearia, plano-obcompressa vel subtetragona, griseo-brunnea, exalata, apice et marginibus et minus costa interiore breviter denseque setosa, unaquaque facie ±8-sulculata, corpore marginalia ±7 mm. longa et usque ad 1.3 mm. lata alia

usque ad 10 mm. longa et 0.6–0.7 mm. lata, apice biaristata aristis filiformibus antrorsum hispidis circ. 4–5 mm. longis, 1–2 squamellis interdum interjectis.

Type specimen: Collected by *Wilhelm Buch*, No. 1137, at altitude of 1,800 meters, in open forests, Morne la Selle, Haiti, January (Berl.).

Distribution: Known only from Haiti.

Specimens examined: *Emery C. Leonard 4103*, on cliff near Fond Parisien, Etang Saumatre, Haiti, May 5–13, 1920 (U.S.).

5. **Coreopsis cyclocarpa** Blake, Proc. Amer. Acad. 49: 339. 1913. *Leptosyne mexicana* A. Gray in Wats. Proc. Amer. Acad. 22: 429. 1887.

Herba perennis, 6–7 dm. alta; caulibus pluribus e radice lignea, infra parce pubescentibus et 1–2 mm. crassis. Folia opposita, integra vel prope medium rarissime trilobata, lamina (vel segmentis) lineari-filiformia, basi ciliata, apice acuta, 2–6 cm. longa. Capitula corymbose disposita, non numerosa, tenuiter pedunculata pedunculis glabris vel superne sparsim hispidis plerumque 2–7 cm. longis, pansa ad anthesin 1.5–2.5 cm. lata et circ. 6–8 mm. alta. Involucri bracteae exteriores 5 vel 6, glabrae, late lineari-oblongae vel ovato-lanceolatae, crassiusculae, apice acutae vel mucronatae, 2–3 (–3.5) mm. longae; interiores ovatae vel ovato-lanceolatae, glabratae vel apice fimbriato-ciliatae, 5–7 mm. longae. Flores ligulati 8–10, flavi, fertiles, ligula oblongi, apice subprofunde dentati, circ. 1.1–1.3 cm. longi. Paleae oblanceolatae, apice rotundato-obtusae, 4–5 mm. longae. Flores tubulosi exanulati, styli ramis apice incrassatis breviter appendiculatis. Achaenia valde obcompressa, epapposa; extima (ex floribus ligulatis) obovata, purpureo-nigrescentia, anguste alato-marginata, circ. 3.5 mm. longa et circ. 2.2–2.8 mm. lata; alia minora.

Type specimen: Collected by *Edward Palmer*, No. 568, along a rivulet in a grassy bottom, Río Blanco, State of Jalisco, Mexico, September, 1886 (U.S.).

Distribution: State of Jalisco, Mexico.

Specimens examined: *Palmer 568* (type, U.S.; cotype, Gray); *C. G. Pringle 3570*, State of Jalisco, September 10, 1890 (Gray); *idem 3841*, by streams, etc., near Guadalajara, State of Jalisco, September 24, 1891 (Berl.; Field, 2 sheets; Gray; N.Y.); *idem 11546*, alt. 1,500 meters, dry bluffs near Guadalajara, State of Jalisco, October 4, 1903 (Field; Gray); *J. N. Rose & J. H. Painter 7480*, near Guadalajara, September, 1903 (N.Y.).

6. **Coreopsis pinnatisecta** Blake, Proc. Amer. Acad. 49: 339. 1913. *Leptosyne Pringlei* Robins. & Greenm. Amer. Journ. Sci. 3. 50: 155. 1895.

Perennis, e radice brevi-oblonga crassiuscula lignosaque, 3–6 dm. alta, caulibus pluribus, adscendentibus, simplicibus vel subsimplicibus, infra foliosis supra subnudatis, striato-angulatis, glabratis vel infra moderate hispidis. Folia opposita, petiolata petiolis 0.5–1.2 cm. longis, petiolo adjecto 2–3 cm. longa, subrigida, pinnata, adscendentia, sparsim hispida; rhachi et (plerumque 5 vel 7) foliolis linearibus, acriter apiculatis, 0.4–1 mm. latis, foliolis 6–12 mm. longis inferioribus sensim longioribus. Capitula solitaria vel 1–4-congregata inflorescentia corymbosa, tenuiter pedunculata pedunculis 5–15 cm. longis, radiata, pansa ad anthesin 1.5–1.9 cm. lata et circ. 6–7 mm. alta. Involucri glabrati bracteae exteriores 5 vel 6, late oblongae, supra saepe latiores, apice obtusae, 3–4 mm. longae; interiores ovato-oblongae, apice puberulenti subobtusae, circ. 6 mm. longae. Flores ligulati circ. 6, flavi, ligula oblongi, apice 3-denticulati dente mediano minore, fertiles, circ. 9–11 mm. longi. Paleae glabrae, lineari-oblongae, apice subobtusae. Flores tubulosi 5-dentati, infra anulo hispido instructi, stylorum ramis apice incrassatis breviter appendiculatis. Achaenia obovata, atra, glabra, circ. 4 mm. longa et circ. 1.3 mm. lata, apice epapposo rotundata atque emarginata.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 4871, at altitude of 2,100 meters, on the Sierra de San Felipe, State of Oaxaca, Mexico, August 7, 1894 (Gray).

Distribution: State of Oaxaca and reaching northward barely into State of Puebla, Mexico.

Specimens examined: *Pringle 4871* (type, Gray; cotypes, Berl.; N.Y.; Pom.; U.S.); *C. A. Purpus 4098*, Cerro de Paxtle, vicinity of San Luis Tultitlanapa, State of Puebla, September, 1909 (Field; Gray; N.Y.).

7. **Coreopsis insularis** (Brandeg.) Blake, Proc. Amer. Acad. 49: 340. 1913. *Leptosyne insularis* Brandeg. Erythea 7: 5. 1899.

Herbacea, probabiliter perennis, decumbens et diffuse ramosa, fere glabra, forsitan 3–6 dm. alta. Folia opposita, petiolata petiolis ±6 mm. longis, petiolo adjecto 1–2.5 cm. longa, pinnatim plerumque 3- (rarius 5-) lobata, lobis anguste linearibus 0.4–1 mm. latis. Capitula pauca, tenuissime pedunculata pedunculis glabris saepius 0.8–2 dm. longis, radiata, pansa ad anthesin circ. 1.3 cm. lata et circ. 5–6 mm. alta. Involucri bracteae exteriores circ. 5 vel 6, lineares

vel lineari-lanceolatae, subglabrae, apice obtusae vel rotundatae, circ. 2.5–3.5 mm. longae; interiores ovatae vel oblongo-acuminatae, 4–5 mm. longae. Flores ligulati ±5, flavi, fertiles, ligula elliptico-oblongi, apice 2-lobulati, circ. 7 mm. longi. Paleae lineares. Flores tubulosi minute 2–5 mm. longi, exanulati, stylorum ramis termino anguste elongato-conicis. Achaenia extima (ex floribus ligulatis orta) valde obcompressa, elliptico-obovata, late alata, glaberrima, 3.5–4.2 mm. longa, epapposa; interiora angustiora, anguste marginata.

Type specimen: Collected by *A. W. Anthony*, No. 394, on Socorro Island, off coast of Baja California, Mexico, March–June, 1897 (Calif.).

Distribution: Known only from Socorro Island, off coast of Baja California.

Specimens examined: *Anthony 394* (type, Calif.; cotypes, Gray; U.S.); *F. S. Bachelew 223*, Socorro Island, May 27–July 3, 1903 (Gray; N.Y.).

8. **Coreopsis maritima** (Nutt.) Hook. f. Bot. Mag. *pl. 6241.* 1876. *Tuckermannia maritima* Nutt., Trans. Amer. Phil. Soc. 2. 7: 363. 1841. *Leptosyne maritima* (Nutt.) A. Gray, Proc. Amer. Acad. 7: 358. 1868; etiam Noblet, Rev. Hort. 1873: 330 et *pl.* (sine num.). 1873. *L. maritima* var. *gigantea* Hort. ex Noblet, loc. cit. *Leptogyne maritima* (Nutt.) A. Gray ex Hook. f. loc. cit. (sphalm).

Caules carnoso-herbacei, e radice crassa profunda recta subligneaque, patentes, ramosi, glabri, 3–8 dm. alti. Folia nunc alterna nunc opposita, petiolata petiolis latis vittatis striatis basi dilitatis 1–7.5 cm. longis, petiolo adjecto saepius 1–1.5 cm. longa, 2–3-pinnata, segmentis oblonge linearibus, planis, obtusis, 1–2.5 mm. latis et usque ad 3 cm. longis. Capitula non numerosa, speciosa, elongate pedunculata pedunculis robustis glabris plerumque 1.5–4 dm. longis, radiata, pansa ad anthesin 6.5–8 (raro usque ad 13.5) cm. lata et ±1.5 cm. alta. Involucri bracteae exteriores 6–8, oblongae vel ovato-lanceolatae, obtusae, glabrae vel apice minutissime pubescentes, 1–2 cm. longae; interiores oblongae, apice pubescentes, saepius paulo longiores. Flores ligulati 14–20 (plerumque 16–18), flavi, ligula elliptico-oblanceolati, apice circ. 3-denticulati, 2–3.5 (–5.5) cm. longi. Paleae glaberrimae, oblongo-lineares, apice acutae, demum circ. 1–1.2 cm. longae. Florum tubulosorum stylorum rami abrupte conico-incrassati vix appendiculati, anulo glabro. Achaenia anguste oblongo-obovata, plana, nigra nisi alis atro-brunneis, circ. 6–7 mm. longa et alis inclusis 2–3.5 mm. latis, apice glabra vel interdum alis productis breviter 1–2-aristata.

Type specimen: Collected by *Edward Tuckerman, Jr.*, on shelving rocks, near sea, San Diego, California. Type material not examined, perhaps still extant among the Nuttall plants (Brit., Kew, or Phila.).

Distribution: Southwesternmost California; rare northwestwardly as far as Monterey County and southwardly in Baja (Lower) California as far as All Saints' Bay and San Martín Island.

Specimens examined: *A. W. Anthony 216*, San Martín Island, Baja (Lower) California, March–June, 1897 (Field; Gray; Pom.); *Margaret Armstrong 741*, San Diego, California (N.Y.); *T. S. Brandegee*, San Martín Island, Baja California, April, 1897 (Pom.); *idem*, San Diego, California, June, 1900 (Pom.); *idem*, eodem loco, May, 1906 (N.Y.); *Harley P. Chandler 5123*, La Jolla, California, April 16, 1904 (N.Y.); *F. E. & E. S. Clements 226*, cliff edge, dune strand, eodem loco, March 14, 1914 (Field; Gray; N.Y.); *D. Cleveland*, San Diego, California (Gray); *R. B. Cowles*, moist slope, Coronado Islands, Baja California, March 29, 1921 (Pom.); *G. W. Dunn*, eodem loco, April 17, 1891 (Field); *Alice Eastwood 2565*, Point Loma, California, April 6, 1913 (Gray); *Miss F. E. Fish*, All Saints' Bay, Baja (Lower) California, May, 1882 (Gray); *G. L. Fleming & W. W. Eggleston 19676*, alt. 50 meters, Torrey Pines Reservation, San Diego County, California, April 10, 1924 (Gray; Pom.); *Hort. Bot. Harvard Univ.* cult. annis 1851 et 1852 e sem. a Fremontio lect. (Gray); *Marcus E. Jones*, Todos Santos Bay, Baja California, April 11, 1882 (Pom., 2 sheets); *idem*, ranch 29 miles southwest of Tía Juana, Baja California, April 13, 1925 (Pom., 2 sheets); *idem*, Coronado Islands, Baja California, June 10, 1926 (Pom.); *idem 3134*, Soledad, California, March 29, 1882 (N.Y., 2 sheets; Pom., 2 sheets); *A. J. McClatchie*, San Diego, California, April, 1893 (N.Y.); *Philip A. Munz 7955*, sea bluffs, Cardiff, California, May 9, 1924 (Gray; Pom.); *C. R. Orcutt*, Point Loma, California, March 24, 1884 (Field); *idem & W. S. Bowne*, San Diego, 1884 (N.Y.); *C. C. Parry*, eodem loco, 1850 (N.Y., 2 sheets, one from the Torrey Herbarium and constituting the basis of a drawing by Riocreux); *idem*, eodem loco, 1883 (Gray); *C. G. Pringle*, bluffs of the seashore, eodem loco, April 25, 1882 (Field); *F. M. Reed 6147*, Potrero Canyon, Baja California, February 5, 1929 (Pom.); *M. S. Snyder*, seashore, La Jolla, California, February 25, 1895 (Field, 2 sheets); *Mary F. Spencer 86*, in beach sand, vicinity of San Diego, California, April 16, 1916 (Gray; N.Y.); *H. Strauss*, San Diego and nearby islands, September 24, 1908 (Berl.) and February 3, 1912 (Berl.); *L. Street*, San Elejo Lagoon, Baja California, May 12, 1917 (Pom.).

9. **Coreopsis gigantea** (Kell.) H. M. Hall, Univ. Calif. Publ. Bot. 3: 142. 1907; cf. S. B. Parish, Muhlenbergia 8: 133–134. 1913; etiam C. F. Millspaugh, Field Mus. Bot. 5: 284, *pl. 9* and *pl. 13, f. 1.* 1923. *Leptosyne gigantea* Kellogg, Proc. Calif. Acad. 4: 198. 1872. *Tuckermannia gigantea* (Kell.) Jones, Contrib. West. Bot. No. 15: 74. 1929.

Perennis, erecta, e radice magna plus minusve lignosa, caule robusto carnoso vix lignoso 5–12.5 cm. crasso et plerumque 3–12 rarius usque ad 20 rarissime usque ad 30 dm. alto, durante per 3–8 annos, ramis glabris, primariis distantibus horizontalibus vel adscendentibus terminos versus foliosis. Folia saepius alterna, petiolata petiolis glabris carnosis basi plus minusve dilatatis 2–9 cm. longis, petiolo adjecto saepius 0.8–2 dm. longa, glabra, plerumque 2–3-pinnata, segmentis nunc moderate (0.8–1.3 mm. latis) nunc angustissime (0.25–0.4 mm. latis) lineari-filiformibus, integris vel lateraliter subemarginatis, saepe 3-nervatis, usque ad +5 cm. longis. Capitula pedunculata pedunculis (ramulis ultimis) subrobustis stramineis nudis vel subnudis corymbose congregatis plerumque 1–2 dm. longis, plerumque radiata, pansa ad anthesin 4–8 cm. lata et circ. 10–13 mm. alta. Involucri glabri bracteae exteriores 5–7, oblongo-lineares vel lineari-lanceolatae, apice truncatae, 1–2 cm. longae, quam interiores 12–15 ovato-oblongae vel obovatae apice pubescentes nunc paulo breviores nunc vix longiores. Flores ligulati 10–16, flavi vel interdum apice pallido-flavidi, ligula anguste vel late oblanceolati, apice circ. 3-dentati, 2–3.8 cm. longi. Paleae oblongo-oblanceolatae, glaberrimae, apice obtusae, demum ±7 mm. longae. Florum tubulosorum stylorum rami abrupte incrassati non appendiculati, anulo setis capitatis hispido. Achaenia subplana, obovato-oblonga vel oblanceolato-oblonga, glabrata, nigra vel marginibus latis subincrassatis atro-brunnea, omnino (alis inclusis) 5.5–6.8 mm. longa et 2.5–3.5 mm. lata, apice calva vel alis productis obsolete bidentata, saepe poculo minutissimo centrali coronata.

Type specimen: Collected by *William George Washington Harford* (under auspices of *Captain S. Forney, United States Coast Survey*), near Cuyler Harbor, San Miguel Island, about 40 miles off coast of Santa Barbara, California.

Distribution: San Luis Obispo to Ventura counties, southwestern California; also on islands off shore and extending southwardly as far as Guadalupe Island, off coast of Baja (Lower) California.

Specimens examined (all from California or islands nearby except where otherwise noted [*Palmer 41*]): *Anon.*, mouth of Santa Maria

River, February 7, 1880 (Gray); *T. S. Brandegee*, Island Santa Cruz, April, 1888 (Gray); *Dr. Coulter 316*, San Miguel to Santa Barbara (Gray); *M. B. Dunkle 1857*, alt. 4.5 meters, shallow soil on rock, Bird Rock, Santa Catalina Island, April 11, 1928 (Pom.); *Alice Eastwood*, Point Sal (near boundary between Santa Barbara and San Luis Obispo counties), May 12, 1896 (Gray); *W. W. Eggleston 19577*, alt. 30 meters, Concepcion to Jalama, Santa Barbara County, March 29, 1924 (Gray; Pom.); *A. D. E. Elmer 3634*, Surf, Santa Barbara County, May, 1902 (Field; Gray; Pom.); *Roxana S. Ferris 7572*, ocean side of sand dunes, 5 miles south of Surf, Santa Barbara County, April 4, 1929 (Pom.); *Grant & Wheeler 680* and *2228*, Catalina Island, April 21–26, 1904 (Field; N.Y.; Pom.); *John Thomas Howell 8220*, San Nicolas Island, March 13, 1932 (Pom.); *Marcus E. Jones*, Santa Cruz Island, April 13, 1924 (Pom., 2 sheets); *idem*, Malibu Hills, north of Santa Monica Mountains, April 26, 1926 (Pom.); *idem*, Santa Cruz Island, March 25, 1929 (Pom.); *Philips Mills Jones*, Santa Rosa Island, April, 1901 (Calif.); *Ezra C. Knopf 56*, in rocky soil on hillsides, Pebble Beach Road, Santa Catalina Island, March 26, 1921 (Field); *idem 258*, Bird Rock, Santa Catalina Island, November 20, 1921 (Field); *C. F. Millspaugh 4630*, eodem loco, January 22, 1920 (Field); *Philip A. Munz 11378*, sand dunes, Surf, May 17, 1929 (Pom.); *idem & E. Crow 11553*, Santa Cruz Island, April 7, 1930 (Pom.); *iidem 11691*, seedlings on shaded wall of Water Canyon, Santa Rosa Island, April 8, 1930 (Pom.); *iidem 11750*, shaded canyon wall northwest of ranch house, Santa Rosa Island, April 9, 1930 (Pom.); *Munz & J. Voss 11877*, high exposed cliff, San Miguel Island, April 10, 1930 (Pom.); *L. W. Nuttall 571*, on sea cliffs, near Avalon, Santa Catalina Island, May 14, 1920 (Field); *Edward Palmer 41*, Guadalupe Island, off Baja (Lower) California, 1875 (Berl.; Gray); *Parry*, San Diego (Gray); *Miss Plummer*, mountains above Santa Barbara, 1878 (Gray); *Huron H. Smith 5034*, road to Pebble Beach, Santa Catalina Island, May 30, 1912 (Field); *Blanch Trask 76*, San Nicolas Island, April, 1901 (Gray, 2 sheets); *W. G. Wright*, Ventura County, March, 1894 (Field).

10. **Coreopsis Bigelovii** (A. Gray) Voss in Sieb. & Voss, Vilmorin Blumeng. ed. 3. 1: 488. 1894 (where spelled *C. Bigelowii*). *Pugiopappus Bigelovii* A. Gray, Pacif. R. Rept. 4: 104. 1857. *P. Breweri* A. Gray, Proc. Amer. Acad. 8: 660. 1873. *Leptosyne Bigelovii* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 300. 1884. *L. Hamiltonii* Elmer, Bot. Gaz. 41: 323. 1906. *Coreopsis Bigelovii* (A. Gray) H. M. Hall, Univ. Calif. Publ. Bot. 3: 141. 1907.

Herba annua, erecta, 1–4 dm. alta, caulibus saepius pluribus vel numerosis, simplicibus vel inferne ramosis, basim versus foliosis, supra multum elongatis ac nudis pro pedunculis, glabris. Folia saepe dense congregata, plus minusve alterna, petiolata petiolis usque ad 6 cm. longis, petiolo adjecto 5–11 cm. longa, plerumque 1–2-pinnata, segmentis ultimis linearibus, planis, obtusiusculis, submembranaceis, glaberrimis vel rarius vix scabrido-hispidis, plerumque 0.6–1.7 mm. latis. Capitula caules (pedunculos) terminantia, radiata, pansa ad anthesin 2–4.2 cm. lata et 0.8–1 cm. alta. Involucri glabri bracteae exteriores circ. 8, lineares, apice obtusiusculae ac nitido-induratae, 4–9 mm. longae; interiores oblongo-ovatae, moderate longiores. Flores ligulati 8, flavi (interdum infra intense supra aegre), ligula elliptico-oblanceolati vel anguste obovati, apice dentati, fertiles, 1–2 cm. longi. Paleae lineari-oblongae vel naviculoideae, obtusae vel subacutae, glabrae, apice minute eroso-ciliatae, demum circ. 7–9 mm. longae. Flores tubulosi anulo glabri, stylorum ramis abrupte terminantibus et vix appendiculatis. Achaenia dimorpha exteriora (e floribus ligulatis) valde obcompressa, cuneato-obovata, rubro-nigra, glabrata, faciebus valde rugosa, marginibus anguste calloso-alata, apice exaristata, 4–5 mm. longa et 2–3 mm. lata; interiora (e floribus tubulosis) angustiora, oblongo-linearia, faciebus nitidis nigra, tergo glabrata ventre erecte albido-villosa, marginibus densissime erecto- et albido-villosa, corpore 4–6.2 mm. longa et ±1.5 mm. lata, apice biaristata aristis lanceolatis planis densissime erecteque albido-ciliatis circ. 2–3 mm. longis, inter aristas poculo membranaceo vix manifesto coronata.

Type specimen: Collected by *John Milton Bigelow*, Mojave Creek, California, 1853–1854 (Gray).

Distribution: California.

Specimens examined: *R. Bacigalupi 1209*, alt. 540 meters, just above Oak Grove on the Mineral King Road, Tulare County, April 23, 1925 (Pom.; forma elatior); *Bigelow* (type, Gray); *W. H. Brewer 241*, San Buenaventura, 1860–1862 (Gray; sub nom. *Pugiopappo Breweri*); *Ira W. Clokey & B. Templeton 4520*, alt. 350 meters, dry open hillside, Mandeville Canyon, Santa Monica Mountains, March, 1929 (Pom.); *Frederick V. Coville & Frederick Funston 742*, alt. 800–2,000 meters, Shepherd Canyon, Argus Mountains, April 30, 1891 (Berl.; Field; Gray); *Craig, Newsom, & Hiland 80*, at 35 miles south of Randsburg, Mojave Desert, April 5, 1927 (Pom.); *W. R. Dudley 340*, region of Tehachopi Peak, Tehachopi Mountains, June 25, 1895 (N.Y.); *Alice Eastwood*, Kaweah, April 27, 1895 (Gray); *H. C.*

Ford, Santa Barbara County, 1889 (Gray); *G. B. Grant 5424*, Saugus, April 23, 1903 (Pom., 2 sheets); *H. M. Hall 3074*, alt. 1,050 meters, vicinity of Elizabeth Lake, Antelope Valley, southern California, May 1–3, 1902 (Pom.); *A. A. Heller 7662*, Kern Canyon, Kern County, April 12, 1905 (Field; Gray); *C. L. Hitchcock 12340*, near brush, open desert, 10 miles southwest of Shoshone, April 17, 1932 (Pom.); *Marcus E. Jones*, alt. 1,380 meters, Darwin, April 28, 1897 (Pom.); *idem*, alt. 1,380 meters, Shepherd's Canyon, Argus, Mountains, April 30, 1897 (N.Y.; Pom.); *idem*, alt. 1,800 meters, Pleasant Canyon, Panamint Mountains, May 6, 1897 (Pom.); *idem*, alt. 1,140 meters, Cajon Pass, May 16, 1903 (Pom., 2 sheets); *idem*, Cave Spring, March 12, 1924 (Pom.); *William L. Kennedy*, Fort Tejon, spring of 1876 (Field); *J. G. Lemmon*, top of Mount Diablo (Field); *idem 138*, Mojave Desert, 1880 (Gray); *Philip A. Munz 4466*, alt. 1,140 meters, dry slope near south side of summit, Cajon Pass, southern California, April 27, 1921 (Pom.); *idem 9136*, alt. 900 meters, dry slope, Tule River, Tulare County, March 22, 1925 (Pom.); *idem 9186*, alt. 900 meters, disintegrated lava, north of Parkfield, Monterey County, March 24, 1925 (Pom.); *idem 10042*, sandy desert, 5 miles south of Willow Springs, April 4, 1926 (Pom.); *idem, R. D. Harwood & I. M. Johnston 4077*, alt. 1,200 meters, clearing in chaparral, north side of Cajon Pass, May 25, 1930 (Pom.); *Munz & D. Keck 7842*, gravelly wash, 7 miles east of Daggett, April 6, 1924 (Pom.); *iidem 7879*, sandy wash, 10 miles southwest of Garlic Springs, Mojave Desert, April 8, 1924 (Pom.); *Samuel B. Parish*, Marengo, April, 1882 (Field); *idem & W. F. Parish 226*, Whitewater River, March, 1881 (Berl.; Field); *C. C. Parry*, Pacific Coast of North America, 1880 (Field); *idem 115*, eodem loco, 1881 (Field); *idem & J. G. Lemmon 184*, southern California, etc., 1876 (Field); *C. G. Pringle*, hills bordering the Mojave Desert, May 11, 1882 (Field; Gray); *C. A. Purpus 5063*, alt. 300–600 meters, sunny hillsides, Middle Tule River, April–September, 1897 (Gray); *idem 5531*, alt. 1,200–1,500 meters, hillsides near Erskin Creek, southeastern California (Gray); *Marjorie Shaw 1941*, Upper Cajon Pass, May, 1917 (Pom.); *eadem, Edna Spaulding & Mrs. C. L. Walton*, alt. 900 meters, Antelope Valley, Mojave Desert, April 6–8, 1917 (Pom.); *Mary F. Spencer 407*, summit of Cajon Pass, San Bernardino County, April 27, 1917 (Gray; Pom.); *eadem 1954*, alt. 960 meters, Mojave Desert, May 1, 1922 (Gray; Pom.); *eadem 2040*, rocky places, Maillard Canyon, near Banning, April 23, 1922 (Pom.); *William Trelease*, Hesperia, April 10, 1892 (Mo., 2 sheets); *G. R. Vasey*

290, Branch of Mojave River, 1880 (Field; Gray); *W. G. Wright*, San Bernardino, 1880 (Berl.); *idem 172*, Colorado Desert, March, 1881 (Gray).

11. **Coreopsis Calliopsidea** (DC.) A. Gray in Torr. Bot. Mex. Bound. 90. 1858. *Agarista Calliopsidea* DC. Prodr. 5: 569. 1836; Regel, Gartenflora 23: 356, *pl. 816*. 1874. *Pugiopappus Calliopsidea* (DC.) A. Gray, Proc. Amer. Acad. 8: 660. 1873; Bot. Calif. 1: 355. 1876. *Leptosyne Calliopsidea* (DC.) A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 300. 1884. *L. Calliopsidea* var. *nana* A. Gray, loc. cit.

Herba annua, erecta, glabra, 1–6 dm. alta, caule tereti simplici vel ramoso nunc usque ad medium (vel ultra) nunc tantum ad basim folioso. Folia alterna, petiolata petiolis alatis usque ad 2 (raro –5) cm. longis, petiolo adjecto 1–7 cm. longa, 1–2-pinnatifida rhachi lobisque planis linearibusque plerumque 0.6–1.7 (raro –5) mm. latis. Capitula ramos elongatos aphyllos terminantia, solitaria, radiata, pansa ad anthesin 2–5 cm. lata et circ. 9–12 mm. alta. Involucri bracteae exteriores 4–6, oblongo-ovatae vel saepius ovato-cordatae, apice obtusae, angustissime pallido-marginatae, tergo longitudinaliter 4–13-striatae, 4–7 mm. longae; interiores circ. 8, oblongo-ovatae, apice acutae vel pubescentes, 6–13 mm. longae. Flores ligulati plerumque 8, flavi, tubo clavo-setosi, ligula late cuneato-obovati, apice plus minusve truncati et irregulariter multidenticulati, 1–2.5 cm. longi. Paleae lineari-oblanceolatae, longitudinaliter nitido-striatae striis interrupte brunneis, supra minutissime eroso-ciliatae, plerumque 4–7 mm. longae, cum achaenio deciduae, ad faciem hujus exteriorem applicatae. Flores tubulosi corolla 5–dentati, basim versus clavo-setosi, anulo pubescentes, stylorum ramis terminaliter brevi-conici. Achaenia plana dimorpha, exteriora (ex floribus ligulatis) obovato-oblonga faciebus nitidis purpureo-nigrisque glabra vel sparsim pulverulenta, margine subanguste alata ala parce incrassata, apice calva, omnino ±4.5 mm. longa et ±2.2 mm. lata; interiora (ex floribus tubulosis) lineari-oblanceolata vel cuneato-oblonga, nigra, tergo nitida glaberrimaque, marginibus ventreque erecte elongato-villosa, corpore 4–5 mm. longa, apice biaristata aristis circ. 3–4 mm. longis densissime antrorso-hispidis.

Type specimen: Collected by *David Douglas* in California (Del.).

Distribution: Southern half of California.

Specimens examined: *Anon.*, loco ignoto (Berl.); *Townsend S. Brandegee*, Alcalde, Fresno County, April, 1891 (Field); *Craig, Newsom & Hiland 129*, Randsburg, April 5, 1927 (Pom.); *David*

Douglas, California (Gray); *idem* (distrib. Herb. Soc. Hort. Lond.), California, 1833 (Berl.; doubtless a cotype); *Alice Eastwood*, Cuyama, White Hills, May 2, 1896 (Gray); *eadem 3187*, Mojave, Kern County, May 12, 1913 (Gray); *J. B. Feudge 1382*, alt. 750 meters, open desert, Kramer, Mojave Desert, May 25, 1926 (Pom.); *Harvard Univ. Bot. Gard.*, cult., 1871 (Gray); *H. E. Hasse*, Mojave Station, Kern County, March 15, 1889 (Field); *A. A. Heller 7723*, gravelly hillsides, Sunset, April 20, 1905 (Field; Gray); *Ivan M. Johnston*, rather common, sandy soil, near Mojave, May 5, 1920 (Pom.); *idem*, common, 1 mile south of Crutts Post Office, Mojave Desert, May 14, 1922 (Pom.); *Marcus E. Jones*, Cuyama Canyon, April 28, 1926 (Pom.); *idem*, Adelanto, May 12, 1927 (Pom.); *idem*, alt. 900 meters, Mojave, May 20, 1903 (Pom.); *A. Kellogg & W. G. W. Harford 436*, California (Gray); *J. G. Lemmon (137?)*, California (Gray; type of var. *nana* A. Gray); *idem 4520*, Lemmon's Ranch, Cholame, June, 1887 (Gray); *S. B. Parish 9771*, Mojave Station, Kern County, April 26, 1915 (Gray); *Parry*, California (Gray); *W. M. Pierce*, desert, 20 miles east of Victorville, April 12, 1922 (Pom.); *C. G. Pringle*, Mojave Desert, May 14, 1882 (Field; Gray).

12. **Coreopsis Douglasii** (DC.) H. M. Hall, Univ. Calif. Publ. Bot. 3: 140. 1907. *Leptosyne Douglasii* DC. Prodr. 5: 531. 1836. *L. californica* Nutt. Trans. Amer. Phil. Soc. ser. 2, 7: 363. 1841. *L. Newberryi* A. Gray, Proc. Amer. Acad. 7: 358. 1868.

Herba annua, glabra, 1.5–4 dm. alta, caule brevi erectoque ramoso ramis (pedunculis) paucis basim versus foliosis aliter nudis vel raro folio valde imminuto instructis, apice monocephalicis. Folia (subradicalia) petiolata petiolis plerumque 2–5 cm. longis, petiolo adjecto 3–10 (–15) cm. longa, filiformi-linearia integraque vel saepius 2–5-partita lobis lineari-filiformibus apice obtusis. Capitula (solitaria, elongatissime pedunculata) radiata, pansa ad anthesin 2–3.3 cm. lata et 6–8 mm. alta. Involucri glabrati bracteae exteriores 5–16, lineari-attenuatae vel lineari-oblongae, apice obtusissimae, 4–8 mm. longae; interiores ovatae, apice acutiusculae, paulo longiores. Flores ligulati circ. 8, fertiles, flavi (vel apicem versus saepe albidi), ligula oblongi vel ovato-subrotundati, apice circ. 3-dentati dentibus saepe magnis rotundatisque, plerumque 1–1.8 cm. longi. Paleae lineares vel lineari-oblongae, apice obtusae, demum 3–6.5 mm. longae. Flores tubulosi anulo plerumque hispido instructi, stylorum ramis cono hispido lato brevique terminatis. Achaenia obcompressa, cuneato-obovata, diverse rubro-brunnea vel nigro-rubra, primo (sed non demum) nitida, marginibus crasso-

alata, duabus faciebus setis clavo minimo similibus instructa, 2–3 mm. longa et 1.2–1.5 mm. lata, apice exaristata sed poculo minuto membranaceoque coronata.

Type specimen: Collected by *David Douglas* in California (Del.).

Distribution: Southern Arizona westward into southern California and reaching southward slightly into Baja (Lower) California, Mexico.

Specimens examined (all from California except where noted to the contrary): *LeRoy Abrams 3342*, Moro Hills, Fallbrook, April 28, 1903 (Gray); *idem 3628*, dry hills between Campo and Jacumba, May 27, 1903 (Gray; Pom., 2 sheets); *idem 11788*, sandy areas in hills between Rosamond and Mojave, April 30, 1927 (Pom.); *idem 11915*, between Red Rock Canyon and Walker Pass Road, El Paso Range, May 1, 1927 (Pom.); *C. F. Baker 4090*, Claremont, April 15, 1903 (Field; Gray; Pom.); *H. N. Bolander*, Julian City near Golden Cherry Mine (Gray); *Katharine Brandegee*, San Diego, April 25, 1900 (Calif.); *T. S. Brandegee 3368*, common on the mesas, San Diego, April 26, 1903 (Field; Gray; Pom., 2 sheets); *F. E. & E. S. Clements* 224, La Jolla, March 7, 1914 (Field; Gray); *iidem 225*, eodem loco, March 17, 1914 (Calif.; Gray); *D. Cleveland*, San Luis Rey, 1877 (Gray); *Mrs. A. L. Coombs*, Warner's Springs, San Diego County, spring of 1911 (Gray); *Dr. Coulter 339*, California (Gray); *Douglas*, California (cotype, Gray); *Alice Eastwood 2574*, Warner's Hot Springs, San Diego County, April 9, 1913 (Gray); *eadem 3194*, Mojave, Kern County, May 13, 1913 (Gray); *eadem 4377*, Blochman's Ranch, Mariposa County, April 21, 1915 (Gray); *W. W. Eggleston 19748*, alt. 850–950 meters, Jacumba Springs, San Diego County, April 11–16, 1924 (Pom.); *Roxana S. Ferris 7466*, sandy flat between Coso Hot Springs and Coso Junction, Kern County, April 30, 1928 (Pom.); *eadem 7710*, about 5 miles from Mojave or the Willow Springs Road, Kern County, May 3, 1929 (Pom.); *George B. Grant 681*, Altadena, April, 1902 (Field, 2 sheets); *idem 682*, eodem loco et tempore (Gray); *Harvey M. Hall 3973*, northwest corner of Baja California, Mexico, April, 1903 (Field); *Harvard University Botanical Garden*, cult., 1882 (Gray); *H. E. Hasse*, Los Angeles, April 22, 1888 (Field); *A. A. Heller 7674*, Kramer, April 13, 1905 (Field; Gray); *C. L. Hitchcock 12224*, sandy wash, 10 miles southeast of White Tanks, East Riverside County, April 9, 1932 (Pom.); *Edmund C. Jaeger 140*, Cabazon, April 11, 1920 (Pom.); *Ivan M. Johnston*, among creosote bushes in open sandy areas, near Mojave, May 5, 1920 (Pom.); *idem*, on hillside, Victorville, May 15, 1920 (Pom.);

idem, alt. 870 meters, in sandy wash, 5 miles southeast of Victorville, May 17, 1920 (Pom.); *idem 1251*, alt. 600 meters, field above Claremont, March 29, 1917 (Pom.); *Marcus E. Jones*, Pasadena, February 22, 1882 (Pom.); *idem*, Fallbrook, March 25, 1882 (Pom.); *idem*, San Diego, April 3, 1882 (Pom.); *idem*, alt. 300 meters, Whitewater, May 11, 1903 (Pom., 2 sheets); *idem*, alt. 880 meters, Victor, May 17, 1903 (Pom., 2 sheets); *idem*, San Diego, April 14, 1906 (Pom., 2 sheets); *idem*, alt. 1,200 meters, Julian, April 17, 1906 (Pom.); *idem*, near Santa Ana Canyon, March 10, 1926 (Pom.); *idem 3361* pro parte, Pasadena, May 2, 1882 (N.Y.; Pom., 2 sheets); *idem 3373*, eodem loco et tempore (Berl.); *William Kellogg*, Rancho Encinal, Monterey County, April 15, 1903 (Gray); *J. G. Lemmon*, San Bernardino, March, 1880 (Gray); *Philip A. Munz 2148*, foothills, Corona, April 27, 1918 (Pom.); *idem 2538*, alt. 750 meters, desert, Barstow, April 12, 1919 (Pom.); *idem 3814*, alt. 300 meters, dry slope, Santa Ana River Canyon near Rincon, April 11, 1920 (Pom.); *idem 9357*, alt. 480–510 meters, dry bottom of Cobal Canyon, north of Claremont (Gray; Pom.); *idem 12415*, open desert, 20 miles north of Box S Ranch, San Bernardino County, April 21, 1932 (Pom.); *idem & D. Keck 7930*, sandy desert 20 miles west of Barstow, April 10, 1924 (Gray; Pom.); *Philip A. Munz & R. D. Harwood 3385*, alt. 360 meters, gravelly wash, Yemescal Canyon, March 20, 1920 (Pom.); *iidem 3475*, alt. 900 meters, sand, Victorville, March 28, 1920 (Pom.); *Philip A. Munz, L. Street, & G. Williams 2362*, alt. 535 meters, roadside, San Gorgonio Pass, near Cabazon, March 28, 1919 (Pom.); *iidem 2388*, eodem loco et tempore (Pom.); *Newberry*, Sitgreaves Pass, southern Arizona, March 26 (Gray; type of *Leptosyne Newberryi* A. Gray); *Thomas Nuttall*, sine loco vel tempore (Gray); *Charles R. Orcutt*, Point Loma, San Diego, March 12, 1884 (Calif.); *idem*, northern Baja California, April 17, 1886 (Field); *Edward Palmer 126*, Camp Grant, May 10, 1867 (Gray; the specimen cited by A. Gray for his *Leptosyne Newberryi*); *idem 217*, Mojave River, southeastern California, May, 1876 (Field); *idem 677*, San Quentín Bay, Baja California, January, 1889 (Field; Gray); *S. B. Parish 2211*, Whitewater Canyon, April, 1880 (Gray); *idem 5191*, alt. 300–750 meters, vicinity of San Bernardino, April 13, 1903 (Field); *idem 10415*, Mojave Station, Kern County, March 25, 1915 (Gray); *idem & W. F. Parish*, San Bernardino, April, 1881 (Field); *iidem*, foothills of San Bernardino Mountains, May, 1888 (Field); *C. C. Parry*, San Bernardino (Gray); *idem 116* (Gray); *idem & J. G. Lemmon 185*, southern California, etc., 1876 (Field; Gray); *W. M. Pierce*, desert, 20 miles east of Victorville, April 12,

1922 (Pom.); *M. S. Snyder*, La Jolla, March 15, 1895 (Field); Mary *F. Spencer 172*, in hollows of granite rocks, San Diego County, April 8, 1917 (Gray; Pom.); *eadem 563*, desert sand, Hesperia, Mojave Desert, May 4, 1917 (Gray; Pom.); *eadem 653*, alt. 750 meters, in rocky places, Maillard Canyon, April 22, 1922 (Gray); *eadem 653a*, in rocky places, Snow Creek near White Water, Mojave Desert, April 10, 1922 (Gray); *eadem 2123*, alt. 750 meters, in rocky places, Maillard Canyon near Banning, April 23, 1922 (Gray); *Wallace*, Los Angeles, 1854 (Gray).

The exterior involucral bracts, when few and more oblong, would seem to connote a variety. Too many apparently transitional forms have been encountered in herbaria, however, to permit as yet definite conclusions to be reached.

13. **Coreopsis Stillmanii** (A. Gray) Blake, Proc. Amer. Acad. 49: 342. 1914. *Leptosyne Stillmanii* A. Gray in E. Durand, Journ. Acad. Nat. Sci. Phila. 3: 91. 1855; Torr. Bot. Mex. Bound 2: 92. 1859.

Involucri bracteae exteriores 5–8, oblongae, 4–8 mm. longae; achaeniis 3.5–4 mm. longis. . . . . *C. Stillmanii.*

Involucri bracteae exteriores 8–16, tenuissime lineares superne usque ad apicem sensim angustatae, 7–12 mm. longae; achaeniis 4–4.5 mm. longis. . . . . var. *β Jonesii.*

Herba annua, erecta, glabra, 1.5–4.5 dm. alta, infra ramosa ac foliosa, ramis (interdum numerosissimis) in pedunculos nudos erectos monocephalicos elongatis. Folia petiolata petiolis usque ad 5 cm. longis saepe latis planisque, petiolo adjecto 4–10 cm. longa, pinnatim 3–7-partita foliolis membranaceis anguste lineari-spathulatis apice obtusis supra medium plerumque 1–2.5 mm. latis interdum rursus lobatis. Capitula (solitaria, longe pedunculata) radiata, pansa ad anthesin 2–3 cm. lata et 7–9 mm. alta. Involucri bracteae exteriores 5–8, oblongae, glabrae, obtusae, 4–8 mm. longae; interiores late ovatae, apice pubescentes, interdum paulo breviores. Flores ligulati circ. 8, flavi, ligula oblongi vel obovati, apice grosse circ. 3-dentati, fertiles, usque ad 1.5 cm. longi et 1 cm. lati. Paleae glabrae, oblongae, plus minusve acutae, 4–6 mm. longae. Flores tubulosi anulo plus minusve glabri, stylorum ramis termino abrupte crasso-conicis et vix apiculatis. Achaenia cuneato-orbiculata vel anguste cuneato-obovata, plana, dorso glabrata ventre plus minusve papillosa vel aegre setosa setis interdum clavellatis, duabus faciebus nigra, margine crasso-alata rugosaque, circ. 3.5–4 mm. longa et (alis adjectis) 1.4–2.3 mm. lata, apice exaristata sed poculo membranaceo coronata.

Type specimen: Collected by *Dr. Stillman* in valley of the upper Sacramento River, northern California (Gray).

Distribution: California.

Specimens examined: *H. N. Bolander 4520*, hillsides, Auburn, April 10, 1865 (Calif.; Gray; N.Y.; U.S.); *Thomas Bridges 260*, California (N.Y.); *Mrs. C. C. Bruce 1987*, Iron Canyon, Butte County, May, 1897 (Pom., 2 sheets); *J. W. Congdon*, Mariposa Water Ditch, Mariposa County, March 28, 1901 and April 4, 1903 (U.S.); *Harvard University Botanical Garden*, cult., 1873 and 1882 (Gray); *A. Kellogg & W. G. W. Harford 439*, dry sandhills, Antioch, April 16, 1868–1869 (Gray) and April 8, 1869 (N.Y.); *Dr. Stillman* (type, Gray; cotype, N.Y.).

Coreopsis Stillmanii var. β **Jonesii** Sherff, Bot. Gaz. 97: 605. 1936.

Herba ± 2 dm. alta, basi multum ramosa. Capitula ad anthesin 3.5–4 cm. lata et circ. 1 cm. alta. Involucrum glabratum; bracteis exterioribus 8–16, angustissime linearibus, sensim usque ad apicem obtuse truncatum angustatis, 7–12 mm. longis, demum saepe patentibus subreflexisve, quam interioribus oblongo-ovatis paulo brevioribus. Achaenia 4–4.5 mm. longa; corpore ipso nigro, circ. 1 (alis stramineis inclusis circ. 2) mm. lato, glaberrimo vel secundum costam medianam sparsim papillato-hispidulo et alibi interdum paucissimis setulis armato, his apice nunc acribus nunc capitatis.

Type specimen: Collected by *Marcus E. Jones*, No. 3361 pro parte, Pasadena, California, May 2, 1882 (Pom.).

Distribution: Known only from type locality in California.

Specimens examined: *Jones 3361* pro parte (type, Pom.).

14. **Coreopsis petrophila** A. Gray, Proc. Amer. Acad. 22: 428. 1887.

Fruticosa, 6 dm. forsitan quidem 1 m. alta, ramosissima, glabrata, caulibus gracilibus obscure tetragonis, saepe rubescentibus. Folia tenuiter petiolata petiolis 1–2.5 cm. longis, petiolo adjecto 3–6 cm. longa, pinnatipartita, segmentis 5–9 subulato-linearibus, acriter indurato-apiculatis, inaequalibus, majoribus saepius trifidis vel 1–2-dentatis, ultimis 0.6–5 mm. latis. Capitula graciliter brevius-culeque pedicellata (pedicellis pubescentibus) et subcymosa, radiata, pansa ad anthesin 2–2.5 cm. lata et circ. 7–8 mm. alta. Involucri campanulati subcriniti bracteae exteriores lineari-oblongae, minutae, tantum circ. 1–2 (–3) mm. longae; interiores oblongae vel oblongo-

ovatae, 5–6 mm. longae. Flores ligulati 5, flavi, integri, ligula oblongi, 8–12 mm. longi, tubulo hispido. Paleae scariosae, angusto-oblongae vel oblanceolatae, dorso longissime villosissimae, apice trilobatae, quam achaeniorum corpora paulo longiores. Flores tubulosi circ. 6–10, stylorum ramis apice tenuiter hispido-appendiculatis. Achaenia recta, subturgida, obovato-oblonga, nigra, dorso glabra, marginibus intusque longissime villosissima, corpore 3–4.5 mm. longa et 0.7–0.9 mm. lata, apice biaristata aristis tenuibus antrorsum barbellatis 3–4.5 mm. longis.

Type specimen: Collected by *Edward Palmer*, No. 530, hanging loosely about rocks at the entrance of canyons, Río Blanco, State of Jalisco, Mexico, September, 1886 (U.S.).

Distribution: State of Durango and southward into State of Jalisco, Mexico.

Specimens examined: *C. R. Barnes & W. J. G. Land 158*, alt. 1,680 meters, Sierra de Esteban, State of Jalisco, September 28, 1908 (Field); *Edward Palmer 489*, Tejamén, State of Durango, August 21–27, 1906 (Gray; N.Y.); *idem 530* (type, U.S.; cotypes, Gray; N.Y.); *C. G. Pringle 2197*, cool ledges of barrancas, near Guadalajara, State of Jalisco, November 20, 1888 (Gray); *idem 2303*, rocky bluffs of Río Grande de Santiago, near Guadalajara, September 30, 1889 (Field; Gray; N.Y.) *idem 11507*, alt. 1,500 meters, Sierra de Esteban, near Guadalajara, September 30, 1903 (Berl.; Field; Gray).

15. **Coreopsis petrophiloides** Robins. & Greenm. Proc. Amer. Acad. 29: 388. 1894.

Fruticosa, forsitan 7–9 dm. alta, caulibus plus minusve glabratis, superne foliosis; ramulis angulatis, paulo pubescentibus. Folia subsessilia vel petiolata petiolis marginatis usque ad 2 cm. longis, omnino 4–9 cm. longa, rigida, simplicia, rhomboideo-lanceolata, acuta, dimidio superiore inciso-serrata, glandulo-punctata, supra paulo pubescentia, infra glabra ac pallidissima. Capitula in inflorescentias terminales corymbosas congregata, tenuiter pedicellata pedicellis bracteatis plerumque 2–6 cm. longis, radiata, pansa ad anthesin 1.5–2.5 cm. lata et 8–10 mm. alta. Involucri bracteae adpresse hispidae, exteriores circ. 6–8, lineari-oblongae, apice rotundatae ac cartilagineae, tergo 3-nervatae, circ. 2–3 mm. longae; interiores ovali-oblongae, 5–7 mm. longae. Flores ligulati ± 8, flavi, ligula oblongi, apice denticulati, ± 1 cm. longi. Paleae angustissime rhomboideo-lanceolatae, tergo valde erecto-villosae ventre glaberrimae, apicem acrem versus lateraliter acriterque 3-lobatae

lobo terminali multo longiore, ± 6–7 mm. longae. Flores tubulosi 5-dentati, stylorum ramis abrupte breviterque angusto-appendiculatis. Achaenia oblongo-linearia, plana, brunneo-nigra, nitida, longitudinaliter obscuro-sulcata, tergo glabrata, marginibus et ventris nervo mediano perspicue erecto-villosa pilis brunneo-albidis, corpore circ. 5–6.5 mm. longa et pilis exclusis 0.5–1 mm. lata, apice biaristata aristis tenuissimis stramineis antrorsum hispidis circ. 4–5.5 mm. longis.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 5508, at altitude of 2,400 meters, Nevado de Colima, State of Jalisco, Mexico, May 22, 1893 (Gray).

Distribution: Nevado de Colima of southernmost Jalisco, southeastwardly through Michoacán into State of Guerrero, Mexico.

Specimens examined: *Brother G. Arsène*, alt. 2,100 meters, Campanario, vicinity of Morelia, State of Michoacán, December, 1910 (U.S.); *idem 3185*, alt. 2,100 meters, Cerros San Miguel, vicinity of Morelia, November 18, 1909 (Gray; Kew; Mo.; N.Y.; Stockh.; U.S., 2 sheets); *idem 5295*, eodem loco, December, 1910 (Gray; Mo.; U.S.); *idem 6026*, alt. 2,200 meters, Cerro Azul, vicinity of Morelia, 1910 (Gray; Mo.; N.Y.; U.S.); *idem 6060*, alt. 2,200 meters, Cerros San Miguel, vicinity of Morelia, November 15, 1911 (Gray; Kew; Mo.; U.S.); *E. W. Nelson 2185*, alt. 2,100–2,550 meters, northeast slope of Sierra Madre, near Chilpancingo, State of Guerrero, December 24, 1894 (U.S.); *idem 2249*, alt. 2,700–3,060 meters, top of Sierra Madre, eodem loco et tempore (U.S.); *Parkinson*, Mexico (Kew; Oxf.); *Pringle 5508* (type, Gray).

16. **Coreopsis Irmscheriana** Bruns, Mitteil. Inst. Allgem. Bot. Hamburg 8: 81. *f. 11, nos. 6–9*. 1929.

Herba (ex auctore perennis) 2–3 dm. alta, e radice primaria parce fibrosa 5–15 cm. longa; caule erecto, satis dense folioso, rubescenti, tereti, pilis strictis brevibus aspero, laxe ramoso; ramis decumbentibus vel adscendentibus, teretibus vel quadrangularibus, vix sulcatis, rubescentibus, hirtis, 1–2 dm. longis. Folia caulina opposita, brevissime petiolata vel sessilia, anguste ovato-lanceolata, irregulariter crenato-serrata, usque ad 4 cm. longa et 1.5 cm. lata; ramulorum alternantia, saepius sessilia, utrinque pilis rigidis sparse adpresseque hirsuta, plerumque sub 2.3 cm. longa et 0.7 cm. lata. Capitula solitaria ad apices ramorum superne subnudorum dense hirsutorum, radiata, pansa ad anthesin 3–3.5 cm. lata et saltem 1 cm. alta. Involucri bracteae ± 16 irregulariter biseriales, lineari-

oblongae, dense hirsutae, usque ad 8 mm. longae et 2 mm. latae. Flores ligulati ± 12, aurei, ligula oblongi, circ. 1.4–1.6 cm. longi et ± 4 mm. lati. Paleae margine serratae, apice longe acutae, circ. 6 mm. longae. Flores tubulosi lutei, ± 7 mm. longi; tubo inferne piloso; limbi lobis intus pilosis. Achaenia obcompressa, nigra, pilosa, biaristata aristis ciliato-pilosis.

Type specimen: Collected by *Ernesto Guenther* and *Otto Buchtien*, No. 55, at altitude of 30 meters, in the Ravine ("Schlucht") of Chule, Mejía, Lomas, Peru, November 12, 1923 (Hamb., 2 sheets).

Distribution: Known only from type locality in southern Peru.

Specimens examined: *Guenther & Buchtien 55* (2 type sheets, Hamb.; cotype, Mun., from its photograph in Field).

17. **Coreopsis rhyacophila** Greenm. Proc. Amer. Acad. 35: 313. 1900.

Suffruticosa, erecta, glabra, 3–10 dm. alta, caulibus teretibus, griseo-brunneis vel brunneo-rubescentibus, foliosis. Folia opposita petiolata petiolis tenuibus usque ad circ. 6 cm. longis, petiolo adjecto usque ad 11 cm. longa, plerumque 2–3-pinnatisecta, utrinque glabra, glanduloso-punctata, segmentis linearibus vel anguste oblongo-lanceolatis, apice acutis vel acerrimis, membranaceis, saepius 2–5 mm. latis. Capitula corymbosa, non numerosa, tenuiter pedicellata pedicellis glabris nudis vel 1–3-bracteatis saepius 5–7 cm. longis, radiata, pansa ad anthesin 2.5–3 (rarius –4.5) cm. lata et circ. 8–11 mm. alta. Involucri bracteae exteriores circ. 8, patentes vel reflexae, lineares, apice subacutae, basi saepe sparsim hispidae, 4–6 mm. longae; interiores late oblongo-ellipticae, apice pubescentes, 7–9 mm. longae. Flores ligulati 7–10, flavi, ligula elliptico-oblongi, apice plerumque integri, 1.4–2.3 cm. longi. Paleae lineari-oblongae, cum fructu deciduae, ad hujus faciem exteriorem applicatae, apice acres et saepe 1–2-lobatae, dorso ac margine erecto-villosissimae, ventre glabrae, 5–6 mm. longae. Florum tubulosorum styli ramosi, ramis conico-appendiculatis. Achaenia obcompressa, cuneate lineari-oblanceolata, nigra, dorso glabra, margine ac ventris costa mediana erecto-villosissima, corpore circ. 4 mm. longa et circ. 0.8 mm. lata, apice tenuiter biaristata aristis albidis antrorsum hispidis circ. 3–4 mm. longis.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 7866, at altitude of 2,500 meters, in lava fields near Cuernavaca, State of Morelos, Mexico, February 9, 1899 (Gray).

Distribution: States of Michoacán and Morelos, southern Mexico.

Specimens examined: *Brother G. Arsène*, Cerro Azúl, District of Morelia, State of Michoacán, October, 1909 (Field); *Pringle 7866* (type, Gray); *idem 8332*, alt. 2,400 meters, lava fields above Cuernavaca, State of Morelos, May 5, 1900 (Berl.; Field; Gray; N.Y.; Pom.); *idem 8431*, alt. 2,550 meters, eodem loco, October 13, 1900 (Field; Gray; N.Y.; Pom.); *idem 9886*, eodem loco, November 19, 1902 (Berl.; Field; Gray; N.Y.).

18. **Coreopsis Pringlei** Robins. Proc. Amer. Acad. 43: 41. 1907.

Fruticosa, ramosa, ramis glabris teretibus cortice ochraceo-griseo obtectis, ramulis striatis viridibus plus minusve 6-angulatis foliosis. Folia opposita petiolata petiolis ± 1 cm. longis ac saepe marginatis, petiolo adjecto 2–4 cm. longa et 1–3 cm. lata, bipinnatifida, pallide viridia, glaberrima vel vix pilosiuscula, segmentis patentibus angustissime linearibus leviter acutatis integris vel cum lobis secundariis paucis instructis 4–18 mm. longis et 0.6–0.8 mm. latis. Capitula ramulos terminantia solitaria vel corymbose 3–5-aggregata, tenuiter pedunculata pedunculis 1–5 cm. longis nudis vel in mediana parte cum bractea unica lineari instructis, erecta vel nutantia, radiata, pansa ad anthesin 2–3 cm. lata et 7–9 mm. alta. Involucri campanulati bracteae exteriores circ. 8, lineari-oblongae, apice rotundatae basi pilosiusculae, 3–5 mm. longae et 1 mm. latae; interiores oblongo-ovatae, circ. 6–8 mm. longae. Flores ligulati circ. 8, juventate supra aurei subtus flavidi maturitate laete flavi, ligula oblongi, apice integri, circ. 1.2 cm. longi et 4–6 mm. lati. Paleae lineari-oblongae, cum fructu deciduae, ad hujus faciem exteriorem applicatae, apice eroso-ciliatae, circ. 5 mm. longae. Stylorum rami pro floribus tubulosis anguste conico-appendiculati. Achaenia vix matura obcompressa, cuneate lineari-oblanceolata, dorso obscure circ. 4-costata et glabra vel sparsim erecto-villosa, facie ventrali et marginibus erecte villosissima, corpore nigro circ. 5 mm. longa, apice tenuiter biaristata aristis albidis antrorsum hispidis circ. 3–4 mm. longis.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 10050, at altitude of 2,040 meters, on dry ledges, San Juan del Río, State of Querétaro, Mexico, September 8, 1905 (Gray).

Distribution: Known only from type locality in State of Querétaro, Mexico.

Specimens examined: *Pringle 10050* (type, Gray; cotypes, Berl.; Field; N.Y.; U.S.).

19. **Coreopsis rudis** (Benth.) Benth. & Hook. ex Hemsl. Biol. Centr. Amer. Bot. 2: 196. 1881. *Epilepis rudis* Benth. Pl. Hartweg. 17. 1839.

Fruticosa, erecta, hispida, foliosa, forsitan 7–9 dm. alta. Folia opposita petiolata petiolis anguste alato-marginatis circ. 1–2 cm. longis, petiolo adjecto circ. 4–7 cm. longa, vix rigidula, pinnatisecta, segmentis cuneatis lanceolatisve nunc integris nunc grosse dentatis pinnatifidisve, saepius 3–10 mm. latis. Capitula corymboso-paniculata pedicellis tenuibus plerumque 0.5–1.5 cm. longis, radiata, pansa ad anthesin circ. 2.5 cm. lata et circ. 8–10 mm. alta. Involucri campanulati bracteae exteriores circ. 6, oblongae, obtusae, circ. 3–4 mm. longae, interioribus late oblongo-obovatis dimidio breviores. Flores ligulati circ. 5, flavi, ligula ovali-oblongi, neutri, apice subintegri vel plus minusve denticulati. Paleae cum fructu deciduae, ad hujus faciem exteriorem applicatae, dorso valde longeque erecto-villosae, ventre glaberrimae, apice trifidae, circ. 5–6 mm. longae. Flores tubulosi 5-dentati, stylorum ramis cono superatis. Achaenia obcompressa, anguste lineari-oblanceolata, dorso circ. 4-costato glabra, marginibus villosissima, ventre praeter lineam villosam glabra, corpore subnigro 4–5 mm. longa et circ. 0.7–0.8 mm. lata, apice tenuiter biaristata aristis stramineis antrorsum hispidis circ. 2–3 mm. longis.

Type specimen: Collected by *Theodor Hartweg*, No. 116, in pine forests, Bolaños, Cantón of Colotlán, State of Jalisco, Mexico, 1836–1838 (Kew).

Distribution: Known only from type locality in Cantón of Colotlán, State of Jalisco, Mexico.

Specimens examined: *Hartweg 116* (type, Kew; cotypes, Berl.; Gray).

Bentham described the ray flowers as neuter, but Bentham and Hooker (Gen. Pl. 2: 386, sub *Epilepide*. 1873) described them as fertile. In the fruiting heads before me they are completely sterile.

20. **Coreopsis glaucodes** Blake & Sherff ex Sherff, Bot. Gaz. 80: 369. 1925.

Frutex glaberrimus, 1 m. altus, partibus novellis glaucescentibus, caule tereti subgriseo, ramis ramulisque striatis, parce angulatis, subbrunneis, glaucescentibus, internodiis 1–6 cm. longis. Folia opposita tenuiter petiolata petiolis basi in poculum circ. 1 mm. altum connatis, 4–10 mm. longis, petiolo adjecto circ. 1.5–3.5 cm. longa et 6–18 mm. lata, circumambitu saepius cuneata vel rhombica

rarius deltoidea, ad medium vel ultra 3- (vel etiam 4-) lobata et in petiolum cuneate decurrentia, lobis cuneatis vel oblanceolatis vel lineari-lanceolatis vel lanceolatis, acutis, integris (interdum terminali rarius etiam lateralibus 2–3-dentatis), membranaceis, pallido-viridibus, glaucescentibus, plerumque 6–16 mm. longis et 1.5–3.5 mm. latis. Capitula parva 1–4 ad apices ramorum, tenuiter pedunculata pedunculis 1.5–5.5 cm. longis, radiata, pansa ad anthesin 1.2–2 cm. lata et 5–7 mm. alta. Involucri glabri glaucescentisque bracteae exteriores 8, anguste triangularibus, obtusae, 3-nerviae, 2–2.5 mm. longae et 0.2–0.5 mm. latae; interiores oblongae, obtusae, apice obscure ciliolatae, multinerviae, flavo-marginatae, glaucescentes, 5–7 mm. longae et circ. 1.8 mm. latae. Flores ligulati 8, aurei, ligula oblongi, subintegri, circ. 8-nervii, ± 7.5 mm. longi et ± 3.2 mm. lati. Paleae oblongae, subacutae vel obtusae, circ. 5-nerviae, ad lineam medianam pilosae, apice eroso-spinulosae, ± 4.5 mm. longae. Disci florum stigmata deltoidea, hispidula, apiculata. Achaenia oblanceolato-oblonga, obcompressa, griseo-nigra, dorso glabra, marginibus piloso-ciliata, apice ciliata, ventre ad costam medianam sparsim pilosa, corpore 3.5–4 mm. longa et 1.8 mm. lata, biaristata aristis sursum ciliatis, 1.5–2 mm. longis.

Type specimen: Collected by *August Weberbauer*, No. 4048, in the open formation, at altitude of 2,600 meters, below Hacienda La Tahona, near Hualgayoc, Department of Cajamarca, Peru, May 15, 1904 (Berl., 2 sheets).

Distribution: Known only from type locality.

Specimens examined: *Weberbauer 4048* (2 type sheets, Berl.).

21. **Coreopsis microlepis** Blake & Sherff ex Sherff, Bot. Gaz. 80: 370. 1925.

Frutex + 4 dm. altus, caule tenui sub inflorescentia plerumque simplici raro ramis paucis erectis simplicibus ramoso, usque ad 1.8 mm. crasso, hexagono, glabro vel in lineis posita sub nodis plus minusve hispidulo, internodiis 1.3–5 cm. longis, quam foliis plerumque longioribus. Folia opposita tenuiter petiolata petiolis superne submarginatis inferne hirsuto-ciliatis 4–10 mm. longis basi in poculum connatis, lamina circumambitu deltoidea paene ad costam trilobata, 8–21 mm. longa et 7–22 mm. lata, segmentis membranaceis, glabra, margine saepe revolutis, acriter apiculatis, lateralibus cuneatis vel elliptico-obovatis vel spathulatis, integris vel 2–3-dentatis, 5–11 mm. longis et 2–6 mm. latis, terminali 3–4-lobato saepius usque circ. ad medium lobis integris vel 2–3-dentatis. Capitula mediocria 3–15

cymam vel paniculam nudam efficientia rarius solitaria, pedicellata pedicellis pilosis 1.5–5 cm. longis, radiata, pansa ad anthesin circ. 1.5–2 cm. lata et 6–7 mm. alta. Involucri glabri vel basi ipso hispiduli bracteae exteriores 8–9, ovatae vel oblongo-ovatae, subobtusae, 1.5–2 mm. longae et 0.6–0.8 mm. latae; interiores elliptico-oblongae, obtusae, facie subnigrae margine angusta flavidae, 6–7 mm. longae et circ. 2.2 mm. latae. Flores ligulati verisimiliter 8, aurei, ligula oblongo-ovati, subintegri, circ. 7-nervii nervis principalibus dorsaliter sparsimque hirsutulis, ± 6.7 mm. longis et 3 mm. latis. Paleae obovatae, obtusae vel acutae, circ. 6-nerviae, ad lineam medianam pilosae, circ. 4.5 mm. longae. Disci florum stigmata incrassata, hispidula, abrupte apiculata. Achaenia obovata vel oblonga, griseo-nigra, longe piloso-ciliata et duabus faciebus pilosa, corpore 2.8–3.5 mm. longa et circ. 1.2 mm. lata, biaristata aristis subpaleaceis, sursum piloso-ciliatis, 0.8–1.2 mm. longis.

Type specimen: Collected by *Alexander Mathews*, No. 1418, Province of Chachapoyas, Department of Amazonas, Peru, 1835–1836 (Kew, 2 sheets).

Distribution: Known only from type locality.

Specimens examined: *Mathews 1418* (2 type sheets, Kew); *A. Raimondi 1774*, road between Chacapoyas and Cheto, Peru, March, 1869 (Berl.).

22. **Coreopsis Macbridei** Sherff, Bot. Gaz. 89: 369. 1930.

Frutex glabratus, ramosus, caulibus subteretibus. Folia laxe disposita, opposita, petiolata petiolis tenuibus circ. 1–1.5 cm. longis, primaria petiolo adjecto etiam 4–4.5 cm. longa, pinnatim 5–7-secta, segmentis anguste linearibus, glaberrimis, apicaliter acribus, 1–2.5 cm. longis et 1–1.7 mm. latis. Capitula corymboideo-paniculata, numerosa, tenuissime pedunculata (vel pedicellata) pedunculis saepius 3–7.5 cm. longis glaberrimis vel apicem versus vix pubescentibus, radiata, pansa ad anthesin tantum circ. 2 cm. lata et 6–9 mm. alta. Involucri glabrati sicci subnigri bracteae exteriores circ. 8, lineari-oblongae, obtusae, tantum circ. 1.5–2 mm. longae; interiores oblongo-ovatae circ. 5–6 mm. longae. Flores ligulati circ. 8, fusco-flavi, ligula lineari-elliptici, apicaliter integri vel rarius denticulati, tantum circ. 8–10 mm. longi et 1.5–3 mm. lati. Paleae lineari-oblongae, circ. 5-striatae, tergo villosissimae ventre glabrae cum achaenio deciduae. Disci florum stigmata incrassata et minutissime caudato-appendiculata. Achaenia lineari-oblanceolata, valde obcompressa, dorso sub palea glabra, ventre ad costam medi-

anam villosa, marginibus longe perspicueque villoso-ciliata, apice biaristata aristis sursum villosis circ. 2 mm. longis.

Type specimen: Collected by *J. Francis Macbride*, No. 3504, neat compact half-shrub (or shrub) of southwestern rock outcrops, alt. about 2,100 meters, Huánuco, Peru, April 26, 1923 (Field).

Distribution: Peru.

Specimens examined: *Macbride 3152*, ragged shrub, river canyon slopes, alt. about 2,100 meters, Ambo, April 4, 1923 (Field; U.S.); *idem 3504* (type, Field; cotype, U.S.).

The specimens examined had been determined by Dr. S. F. Blake as a form of *Coreopsis Townsendii* Blake, with more leaf lobes than on the type. A careful comparison with the type of that species, however, shows many striking differences. *C. Macbridei* has a more scraggly habit; its leaves are fewer, their petioles narrower, and their divisions 5–7 rather than usually 3; the capitula are more numerous (more than 30 on one sheet), their peduncles and involucres almost completely glabrous (not conspicuously tomentose), their external bracts about 1.5–2 mm. (not 4–4.5 mm.) long, their diameter at flowering about 2 cm., not 2.5–3 cm., the ligules deep yellow (not light yellow) and only about 8–10 mm. long and 1.5–3 mm. wide, not 15–18 mm. long and 5–7 mm. wide, etc.

23. **Coreopsis Killipii** Sherff, Bot. Gaz. 94: 594. 1933.

Fruticosa, glabra, 6–12 dm. alta, ramosa ramis tenuibus angulatis internodiis quam foliis longioribus. Folia petiolata petiolis moderate ciliatis circ. 4–13 mm. longis basi in poculum ± 1.5 mm. altum connatis, petiolo adjecto circ. 1.5–2.5 cm. longa, pinnatim vel subbipinnatim divisa, segmentis ultimis saepius oblongo-linearibus crassiusculis eciliatis planis vel vix revolutis apice acutis subacutisve. Capitula pauca, in pedunculis ramos elongatos superne nudatos terminantibus ± 1–1.2 cm. longis disposita, radiata, pansa ad anthesin ± 2.6–2.8 cm. lata et ± 0.8–1 cm. alta. Involucrum tantum ad basim ipsam hispidum, bracteis exterioribus circ. 8, oblongis, eciliatis, apice obtusis vel rotundatis, 3–5 mm. longis et 1–1.7 mm. latis; interioribus ovato-oblongis, siccis plus minusve atris, apicem versus vix ciliatis, 7–10 mm. longis. Flores ligulati forsitan 5 vel 6, brunneo-flavi, ligula elliptico-oblongi, apice integri vel parce denticulati, circ. 1.2 cm. longi. Paleae spathulato-oblanceolatae, dorso (praecipue ad costam medianam) hispidae ventre glaberrimae, apicem acutum versus ciliatae, circ. 5–6 mm. longae ad corpus achaenii strictim applicatae. Flores tubulosi subbrunneo-flavi, stylorum ramis incrassatis apice subito breviterque conico-

appendiculatis. Achaenia valde obcompressa, cuneato-oblanceolata, nigra vel fere purpurascenti-nigra, dorso glaberrima, ventre marginibusque perspicue erecto-pilosa pilis elongatis sericeis, corpore 4–5 mm. longa, apice biaristata aristis linearibus stramineis antrorsum hispidis 1.5–2.5 mm. longis.

Type specimen: Collected by *Ellsworth P. Killip* and *Albert C. Smith,* No. 21823, straggling shrub 2–4 feet high, open hillside at altitude of 3,000–3,200 meters, Tarma, Department of Junín, Peru, April 20–22, 1929 (Field).

Distribution: Known only from type locality in Peru.

Specimens examined: *Killip & Smith 21823* (type, Field).

24. **Coreopsis parviceps** Blake & Sherff ex Sherff, Bot. Gaz. 80: 368. 1925.

Frutex glaberrimus, caule tereti, striatulato, griseo, ramis ramulisque tenuibus striato-angulatis subbrunneis, internodiis 1.5–4 cm. longis. Folia opposita petiolata petiolis tenuibus basi in pocula brevia et vix ciliolata connatis 3–8 mm. longis; laminis inferioribus circumambitu deltoideis, circ. 2.2 cm. longis et usque ad 2.8 cm. latis, irregulariter 2–4-partitis, crassiusculis, minutissime punctulatis, segmentis linearibus vel lineari-ellipticis 9–16 mm. longis et 1.8–3 mm. latis perlucidule pinnato-venosis apice acutis; superioribus integris vel interdum trilobatis, lineari-ellipticis, 8–19 mm. longis et 1.5–3 mm. latis. Capitula parva, solitaria, tenuiter pedunculata pedunculis glabris ± 2.7 cm. longis, radiata, pansa ad anthesin circ. 1.8 cm. lata et circ. 6 mm. alta. Involucri bracteae exteriores 6–8, lineari-oblongae, glabrae, apice obtusae, circ. 3 mm. longae et 0.8 mm. latae, interiores late lanceolato-oblongae, apice obtusae et eroso-denticulatae, circ. 6 mm. longae et 2.5 mm. latae. Flores ligulati circ. 8, aurei, ligula late oblongo-ovati, circ. 12-nervii, apice subintegri ac subemarginati, circ. 9 mm. longi et 4 mm. lati. Paleae oblongo-obovatae, dorso sparsim pubescentes, circ. 5-nerviae, apice truncatae vel emarginatae plus minusve spinuloso-ciliatae, circ. 3.5 mm. longae. Disci florum stigmata deltoideo-triangularia, acuminata, hispidula. Achaenia valde immatura oblonga, piloso-ciliata, ventre ad costam medianam sparsim pilosa, apice ciliata ac biaristata aristis sursum piloso-ciliatis, 2 mm. longis.

Type specimen: Collected by *Const. De Jelski* (distrib. *Ign. Szyszylowicz*), No. 765, Tambillo, Peru, August 19, 1878 (Berl., 2 sheets).

Distribution: Known only from type locality.

Specimens examined: *De Jelski 765* (2 type sheets, Berl.).

25. **Coreopsis oblanceolata** Blake, Contr. U. S. Nat. Herb. 22: 642. 1924.

Frutescens, caule gracili, glabro, internodiis inferioribus moderate brevioribus superioribus multo longioribus quam foliis. Folia opposita, oblanceolata, integra, coriacea, glabra, apice acutiuscula obtusave et obtuse calloso-mucronulata, de loco diametri maximi sensim in basim petiolo saepe similem angustata, parce revoluta, manifeste unicostata venis lateralibus obscuris, utrinque viridia, circ. 2.5–3.8 cm. longa et circ. 5–7.5 mm. lata. Capitula solitaria vel perpauca, pedunculata pedunculis subtenuibus usque ad 11 cm. longis, radiata, pansa ad anthesin ± 4 cm. lata et ± 1.2 cm. alta. Involucri bracteae exteriores circ. 8, anguste oblongae, basi parce angustatae et sparsissime pubescentes, apice rotundatae vel obtusae, marginibus breviter hispidae, 3-vittatae, circ. 5.5 mm. longae et circ. 1.8 mm. latae; interiores oblongo-obovatae, acutae acuminataeve, apice eroso-ciliatae, circ. 7.5 mm. longae. Flores ligulati ± 8, flavi, ligula elliptico-oblongi, apice bidentati, ± 2 cm. longi et ± 6 mm. lati. Paleae elliptico-ovatae, acuminatae, inferne ciliatae, apicem versus eroso-ciliatae, ± 5 mm. longae. Flores tubulosi flavi, tubi apice pilosi; styli ramis termino breviter triangulatis et acutis. Achaenia immatura valde obcompressa, oblongo-elliptica, ventre pubescentia, dense longo-ciliata, apice setosa, corpore circ. 4 mm. longa, biaristata aristis lanceolato-linearibus, subaequalibus, dense antrorsumque hispidis, circ. 2.2 mm. longis.

Type specimen: Collected by *Charles Henry Tyler Townsend*, No. *A211*, at altitude of 2,400–2,850 meters, on top of the western Cordillera opposite Huancabamba, Peru, September 26, 1911 (Field).

Distribution: Known only from type locality in northernmost Peru.

Specimens examined: *Townsend A211* (type, Field).

25*a*. **Coreopsis Woytkowskii** sp. nov.

Fruticosa, usque ad 7 dm. alta; ramulis sulculatis albido-tomentosis. Folia opposita subtenuiter petiolata petiolis marginatis conduplicatis hispido-ciliatis et faciebus plus minusve setosis usque ad circ. 1.5 cm. longis, petiolo adjecto usque ad 5.5 cm. longa et 0.8–1.5 cm. lata, oblongo-oblanceolata, supra medium vel apicem versus pauciserrata (1–3 dentibus pro utroque latere), apice acuta rarius subtruncata sub medio usque ad petiolum sensim vel curvescente angustata, submembranacea, utrinque minutissime numerosissime-

que glandulo-papillata sed non vel secundum venulas hispidula, suaveolentia. Capitula solitaria ad ramulorum apices disposita, pedunculata pedunculo nitide albo-lanato circ. 2.5–4 cm. longo, radiata, pansa ad anthesin 4–4.5 cm. lata et 1.3–1.8 cm. alta. Involucrum extus basi perspicuissime alibi moderate sparsimve albo-lanatum; bracteis exterioribus ±6, oblongis, supra medium dilatatis, apice rotundis, tergo 3-nervatis et minutissime glandulo-papillatis, circ. 8 mm. longis et 2–2.6 mm. latis; interioribus oblongo-ovatis ±dimidio longioribus. Flores ligulati 8, intense lutei, ligula obovati, apice obscure 2- vel 3-denticulati, ±2 cm. longi, tubo ovarioque plus minusve albo-pilosis. Paleae oblongo-lineares, dorso longissime erecteque sericeo-pilosae, ventre glabrae, apice eroso-emarginatae, ±7 mm. longae. Achaenia matura non visa; valde immatura plana, cuneate linearia, dorso glabra, ventre marginibusque elongate erecteque sericeo-pilosa, apice biaristata aristis tenuissimis antrorsum hispidis corollis subaequalibus.

Type specimen: Collected by *Felix Woytkowski*, No. 24, on rocky hills at altitude of 2,625 meters, vicinity of Celendín, Department of Cajamarca, Peru, June 5, 1936 (Field).

Distribution: Known only from type locality in Peru.

Specimens examined: *Woytkowski 24* (type, Field).

The collector's notes state that this species "grows in profusion in some places." It is very easily distinguishable in its foliage from all other South American species of *Coreopsis*. Fortunately, the type, though collected but very recently, was received in time to be treated in this work. To Mr. Paul C. Standley, Associate Curator of the Herbarium of Field Museum of Natural History, I am indebted for the privilege of examining it.

26. **Coreopsis longula** Blake, Contr. U. S. Nat. Herb. 22: 642. 1924.

Frutex glaber, verisimiliter circ. 1 m. altus, caule ramisque tenuibus et multiangulato-striatis, internodiis quam foliis saepius brevioribus. Folia opposita interdum cum fasciculis axillaribus, simplicia, flagellari-linearia, basi in poculum circ. 1 mm. altum connata, crassiuscula, subrevoluta, sicca minutissime numerosissimeque albido-punctulata, eciliata, apice obtusiusculo cartilagineo-indurata, saepius 4–7.5 cm. longa et 0.6–1.1 mm. lata. Capitula non pauca, pedunculata pedunculis tenuibus 1–4 cm. longis, radiata, pansa ad anthesin ± 2.4 cm. lata et circ. 8 mm. alta. Involucri glabrati bracteae exteriores circ. 8, oblongo-lineares, obtusae,

2.5–4 mm. longae et 0.4–0.6 mm. latae; interiores oblongo-lanceolatae, flavo-marginatae, apice obtuso subtruncatae et eroso-denticulatae, 7–8.5 mm. longae et 2–2.5 mm. latae. Flores ligulati circ. 8, flavi, ligula elliptico-oblanceolati, apice integri vel obscure denticulati, circ. 1.2 cm. longi et 2.5–3.5 mm. lati. Paleae oblongo-lineares, obtusiusculae, 5–7-striatae, glabrae vel dorsaliter ad costam medianam hispidae, 7–8.5 mm. longae et 0.6–1 mm. latae. Disci florum stigmata incrassata, breviter obscureque crasso-apiculata. Achaenia lineari-oblonga, obcompressa, atra, corpore circ. 7 mm. longa et circ. 1 mm. lata, dorso leviter ventre marginibusque graviter sursum pilosa, apice sursum pilosa et vestigio floris minutissimo coronata et biaristata aristis sursum hispidis 2.5–3 mm. longis.

Type specimen: Collected by *Alexander Mathews*, in the Province of Chachapoyas, Peru, 1835–1836 (Gray).

Distribution: Known only from type locality.

Specimens examined: *Mathews*, Province of Chachapoyas, Peru (type, Gray); *idem*, eodem loco, sine anno (Kew) et 1835 (Kew) et 1836 (Kew, 2 sheets).

27. **Coreopsis venusta** HBK. Nov. Gen. et Sp. 4: 180 (229). 1820.

Frutex ramosus, erectus vel procumbens, ramis teretibus glabris striatis, ramulis tetragonis, striatis; omnibus internodiis plerumque 0.6–3 cm. longis. Folia opposita, indivisa, anguste spathulato-linearia, apice acutiuscula, basi angustata, integerrima, exsiccata subcoriacea, subuninervia, eciliata, supra glabra, infra ad costam medianam hispida, 1.5–4 cm. longa et 0.8–1.5 mm. lata. Capitula solitaria, tenuiter pedunculata pedunculis glabratis 5–15 cm. longis, radiata, pansa ad anthesin circ. 2.5 cm. lata et 6–8 mm. alta. Involucri plus minusve hispidi bracteae exteriores circ. 8, oblongae, obtusae, circ. 3.5–4 mm. longae et 1–1.5 mm. latae; interiores ovato-ellipticae, obusae, multinerviae, margine angusto flavidae aliter atro-brunneae, 5–6 mm. longae. Flores ligulati 6–8, aurantiaci, ligula oblonga, apice obsolete tridentata vel subintegri, circ. 12 mm. longa et 5–6 mm. lata. Paleae oblanceolatae, tenuissime membranaceae, flavi, perspicue atronervatae circ. 6 nervis, supra laciniato-ciliatae, circ. 6 mm. longae. Disci florum stigmata incrassata, hispida, apicaliter brevi-caudata. Achaenia lineari-oblonga, obcompressa, brunneo-atra, tergo sub palea glabra, margine piloso-ciliata, ventre hispida saepe plus minusve tuberculata, corpore circ. 5 mm. longa et 1–1.2 mm. lata, apice biaristata aristis sursum piloso-ciliatis circ. 3 mm. longis.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, near Loja (Loxa), Province of Loja, Ecuador (Par.).

Distribution: Ecuador and Peru.

Specimens examined: *A. S. Hitchcock 21564*, alt. 2,200–3,100 meters, Páramo between San Lucas and Oña, Province of Loja, Ecuador, September 7, 1923 (Gray; N.Y.; U.S.); *Humboldt & Bonpland*, near Loja, Ecuador (cotype, Berl.); *iidem*, Páramo de Saraguru, Ecuador (Berl.); *A. Raimondi 6463*, Callacate, Department of Cajamarca, Peru, May, 1879 (Berl.); *idem 12060*, Huambo, Province of Chota, Department of Cajamarca, Peru, June, 1868 (Berl.).

28. **Coreopsis nodosa** Sherff, Bot. Gaz. 94: 595. 1933.

Fruticosa, forsitan 6–8 dm. alta, ramosissima ramulis nunc subteretibus nunc valde angulatis glanduloso-puberulis internodiis numerosissimis plerumque 1–4 rarius usque ad ±10 mm. longis et circ. 1–1.5 mm. crassis. Folia numerosissima opposita, petiolata petiolis plus minusve hispido-ciliatis basi in poculum minutum connatis 1–5 mm. longis (parte inferiore ad ramulos juncta manente post casum foliorum), petiolo adjecto tantum circ. 7–9.5 mm. longa, glabra, pinnatim 3–7-partita segmentis crassiusculis oblongis vel ovato-oblongis sparsim hispidulis apice subobtuso-mucronatis plerumque tantum 2–3.5 mm. longis et 0.4–0.7 mm. latis. Capitula tenuiter pedunculata pedunculis (supra summa folia) circ. 1 cm. longis, radiata, pansa ad anthesin ±1.8 cm. lata et 7–8 mm. alta. Involucri basaliter tomentuloso-hispidi bracteae exteriores circ. 8, cuneato-oblongae, longitudinaliter 3-vittatae, glabratae, apice obtusissimae vel rotundatae, 2–3 mm. longae; interiores cuneato-oblongae apice obtusissimae 4–7 mm. longae. Flores ligulati 6–8, claro-flavi, ligula elliptico-oblongi, apice integri, ±8 mm. longi. Paleae lineari-oblongae, dorso marginibusque erecto-hispidae ventre glabratae, apice acutae, 5–6 mm. longae, ad corpus achaenii strictim applicatae. Achaenia valde obcompressa, cuneate lineari-oblonga, atra, duabus faciebus praesertim ventrali ac marginibus valde erecto-setosa setis longis albidis sericeis, corpore circ. 4 mm. longa, apice biaristata aristis tenuibus stramineis antrorsum setosis 1–1.8 mm. longis, inter aristas poculo minuto coronata.

Type specimen: Collected by *Francis W. Pennell*, No. 13646, open, rocky slope, at altitude of 2,900–3,100 meters, Ollantaitambo, Department of Cuzco (Cusco), Peru, April 26, 1925 (Field).

Distribution: Known only from type locality in Peru.

Specimen examined: *Pennell 13646* (type, Field).

29. **Coreopsis senaria** Blake & Sherff ex Sherff, Bot. Gaz. 80: 367. 1925.

Frutex ramulis hexagonis, lineatim (2 lineis) hispidulis, infra foliorum basibus persistentibus vestitis, internodiis usque ad 10 mm. longis. Folia opposita cum fasciculis axillaribus, brevissime petiolata petiolis tantum circ. 1–1.5 mm. longis glabris omnino connatis; laminis 3-partitis, segmentis anguste lineari-oblanceolatis, apice acutis callosisque, margine integris, carnosis, atro-viridibus, glabris, 1-nerviis, circ. 6–8 mm. longis et 0.6–0.9 mm. latis. Capitula solitaria in pedunculis brevissimis (usque ad 1 cm. longis) hirtellis insidentia, radiata, pansa ad anthesin circ. 2 cm. lata et 7 mm. alta. Involucri bracteae exteriores manifeste biseriales, omnino circ. 18, subaequales, herbaceae, lanceolatae vel lineari-lanceolatae, obtusae vel subacutae, saepe apiculatae, 3-nerviae, infra medium ciliatae, dorso glabrae, 4–5 mm. longae et 1 mm. latae; interiores 8–9, membranaceae, oblongae, obtusae, margine angusto flavidae aliter brunneae, ciliolatae sed faciebus glabrae, circ. 2.5 mm. latae. Flores ligulati circ. 8, aurei, ligula oblongo-ovati, circ. 11-nervati, circ. 6 mm. longi et 3 mm. lati. Paleae lanceolatae, acuminatae, ciliatae, ad lineam medianam pilosae, 5-nerviae, circ. 4 mm. longae. Achaenia valde immatura obovato-oblonga, margine apiceque piloso-ciliata, facie exteriore glabra interiore aegre pilosa, biaristata aristis sursum piloso-ciliatis, circ. 2.2 mm. longis.

Type specimen: Collected by *A. Stübel*, No. 35 pro parte, on punas, on an excursion from Pacasmayo to Moyobamba, Peru, April to June, 1875 (Berl.).

Distribution: Peru.

Specimens examined: *A. Raimondi 436*, heights between Balsas and Celendín, departments of Amazonas and Cajamarca, Peru, April, 1869 (Berl.); *Stübel 35* pro parte (type, Berl.); *Félix Woytkowski 23*, growing up to 6 dm. tall, common, on rocky hills, alt. 2625 m., vicinity of Celendín, Department of Cajamarca, Peru, June 5, 1936 (Field).

The leafy branchlets have a juniperous aspect. The numerous outer bracts of the involucre also afford a ready means of determination.

30. **Coreopsis foliosa** A. Gray, Proc. Amer. Acad. 5: 125. 1861.

Frutex ramosus, caule ramisque subquadrilateralibus striatis hispidis fere occultis. Folia numerosissima opposita glabra petiolata petiolis planis circ. 3–9 mm. longis, petiolo adjecto 1.2–2 cm. longa, lamina nunc digitato-ternata nunc pinnatim 4–7-partita, segmentis

oblanceolatis, crassiusculis, apice obtusiusculis, basim versus angustatis, faciebus minutissime densissimeque albido-punctulatis, margine saepe revolutis, 4–8 mm. longis et 1–1.6 mm. latis. Capitula terminalia, breviter pedunculata pedunculis hispidis tenuibus 0.5–2 cm. longis, radiata, pansa ad anthesin circ. 2.8–3.4 cm. lata et 1.2 cm. alta. Involucri hispidi bracteae exteriores circ. 8, oblongae, apice rotundatae, circ. 5 mm. longae et 1.5 mm. latae; interiores lanceolatae apicaliter obtusae et interdum suberosae circ. 8 mm. longae. Flores ligulati circ. 8, ligula anguste obovati, apice plus minusve denticulati, 1.5–1.9 cm. longi. Paleae late lineari-oblongae, apice obtuso minute erosae, circ. 6 mm. longae et 1 mm. latae. Disci florum stigmata rotundo-incrassata, breviter apiculata. Achaenia late oblanceolata, nigra, piloso-ciliata, una facie perspicue altera leviter pilosa, corpore circ. 5 mm. longa et 1.8 mm. lata, apice biaristata aristis sursum hispidis circ. 3 mm. longis.

Type specimen: Collected by *Alexander Mathews*, No. 1376, Taulia, Peru, in 1835 (Kew).

Distribution: Known only from type locality.

Specimens examined: *Mathews 1376* (type and cotype, Kew).

31. **Coreopsis polyactis** Blake & Sherff ex Sherff, Bot. Gaz. 80: 372. 1925.

Frutex densissime foliosus, 1 m. altus, ramis subteretibus ac sordido-hirsutulis, internodiis 4–14 mm. longis. Folia opposita petiolata petiolis plus minusve ciliatis ad basim in poculum hirsutulum 1 mm. altum connatis, petiolo adjecto 1–1.6 cm. longa, in speciminibus siccis plerumque subflavescentia, tripartita, segmentis integris vel terminali tripartito, linearibus vel anguste lineari-oblanceolatis, 3–6 mm. longis et 0.5–1 mm. latis, acutis, crassis, sparsim hirsutulis praecipue ad margines; axillis plerumque fasciculis obsitis. Capitula saepius solitaria, brevissime pedunculata pedunculis crassiusculis dense flavescenteque subtomentoso-pilosis 1–1.8 cm. longis demum fistulosis, radiata, pansa ad anthesin 3–3.5 cm. lata et 8–10 mm. alta. Involucri bracteae dense flavescenteque subtomentoso-pilosulae exteriores circ. 11, manifeste biseriales, foliaceae, ovatae, obtusae, multinerviae, subaequales, 5–7 mm. longae et 3.3–4.8 mm. latae; interiores circ. 13, crasso-membranaceae, elliptico-oblongae, supra usque ad apicem subobtusum vel subacutum angustatae, anguste pallido-marginatae, multinerviae, quam exteriores dimidio longiores. Flores ligulati circ. 12, aurei, ligula obovati, subintegri, circ. 10-nervii, circ. 1.4–1.6 cm. longi et 6.5 mm.

lati. Paleae lineari-oblongae, acutae, circ. 7-nerviae, supra sparsim ciliolatae, ad lineam medianam pilosae, circ. 6 mm. longae. Disci florum stigmata deltoidea, hispidula, apiculata. Achaenia immatura lineari-oblonga, obcompressa, piloso-ciliata, dorso glabra, ventre pilosa, apice eciliata sed biaristata aristis sursum ciliatis, 3–4 mm. longis.

Type specimen: Collected by *August Weberbauer*, No. 6995, on grass steppes with scattered shrubs, at altitude of 3,500–3,600 meters, between Hacienda Llaguén and Succhabamba, Province of Otuzco, Department of Libertad, Peru, June 28, 1914 (Berl., 2 sheets).

Distribution: Known only from type locality.

Specimens examined: *Weberbauer 6995* (2 type sheets, Berl.).

Distinct from all other South American species of *Coreopsis* in its broadly oval-ovate, biseriate outer involucral bracts.

32. **Coreopsis notha** Blake & Sherff ex Sherff, Bot. Gaz. 80: 373. 1925.

Folia plerumque 3–4 cm. longa.....*C. notha* sensu stricto.

Folia circ. 1.5 cm. longa.....var. *β parvulifolia*.

Frutex 1 m. altus, caule striatulo subtereti glabrescente, ramis striato-angulatis sparsim hispidulis, internodiis plerumque 1–4.5 cm. longis. Folia opposita, tenuiter petiolata petiolis sparsim ciliatis 1–1.5 cm. longis ad basim in poculum plus minusve hispidulum 1.5 mm. altum connatis, petiolo adjecto plerumque 3–4 cm. longa, ternatisecta lamina circumambitu deltoidea, foliolis lateralibus breviter stipitatis vel subsessilibus 3–5-sectis terminali longiusculo stipitato pinnatim 5-secto, segmentis ultimis lanceolatis vel oblongis, acutis, membranaceis, obscure pubescentibus et ciliatis, plerumque 3–8 mm. longis et 1–2.5 mm. latis. Capitula longe tenuiterque pedunculata pedunculis monocephalicis sordide crispo-pilosulis praecipue apicem versus 7–21 cm. longis, radiata, pansa ad anthesin 3.4–3.8 cm. lata et circ. 7–8 mm. alta. Involucri bracteae exteriores 6, oblongae, apice obtusae vel rotundatae, basi plus minusve ciliatae, dorso non nisi ad basim pilosulae ventre sordido-pilosulae, 2–3 mm. longae et 1–1.6 mm. latae; interiores 8, oblongo-ellipticae, obtusae, anguste flavescenti-marginatae, apice minute ciliolatae aliter glabrae, 9–12 mm. longae et 3–4.6 mm. latae. Flores ligulati, aurantiaci, ligula oblongo-obovati, apice subintegri, 13–15-striati, 1.7–2.3 cm. longi et circ. 9 mm. lati. Paleae oblongae, apice truncato hispidulo-ciliatae, ad dorsi lineam medianam pilosae, circ. 12–nerviae. Disci florum stigmata breviter deltoidea, hispidula, apiculata. Achaenia

lineari-oblanceolata, obcompressa, brunneo-nigra, marginibus piloso-ciliata, apice ciliolata, ad ventris costam medianam pilosa, corpore circ. 6 mm. longa et 1.7 mm. lata, bi- (raro tri-) aristata aristis sursum piloso-ciliatis, 2.7–3.4 mm. longis.

Type specimen: Collected by *August Weberbauer*, No. 3812, at altitude of 2,400–2,700 meters, above San Pablo, Province of Cajamarca, Department of Cajamarca, Peru, April 26, 1904 (Berl., 2 sheets).

Distribution: Known only from Department of Cajamarca, Peru.

Specimens examined: *A. Raimondi 7732* and *7914*, alt. 1,920 meters, Cerro de Catache, Cascas, Province of Contumazá, Department of Cajamarca, Peru, May 21, 1875 (Berl.); *Weberbauer 3812* (2 type sheets, Berl.).

Leaves similar to those of the Mexican *C. rhyacophila* Greenm., but smaller and somewhat less dissected. Vernacular name is given as "pul," and the heads are said to be used for dyeing.

Coreopsis notha var. β **parvulifolia** Sherff, Amer. Journ. Bot. 22: 707. 1935.

A specie foliis tantum circ. 1.5 cm. longis differt.

Type specimen: Collected by *A. Raimondi*, No. 6695, Contumazá, Province of Contumazá, Department of Cajamarca, Peru, 1875 (Berl.).

Distribution: Known only from type locality in northern Peru.

Specimen examined: *Raimondi 6695* (type, Berl.).

Sharply separable from *C. notha* by the smaller leaves and perhaps smaller stature of the plant. The more or less filiform leaf petioles offer a ready distinction from the otherwise deceivingly similar *C. fasciculata* var. *laevigata* of southern Peru.

33. **Coreopsis capillacea** HBK. Nov. Gen. et Sp. 4: 180 (230). 1820.

Fruticosa, adscendens vel erecta, caule glabro demum ±8 mm. crassa, forsitan 6–8 dm. alta, ramosa ramis lignosis glabris tetragonisque, ramulis glabratis vel ad terminos hispidulis subdense foliaceis foliis quam internodiis multo longioribus. Folia opposita, petiolata petiolis usque ad 2 cm. longis, petiolo adjecto, 3–6 cm. longa, pinnatim 3–5-partita segmentis filiformibus 0.5–1 mm. latis, glabratis vel rarius minute hispidulis subplanis integerrimis apice acerrimis lateralibus quam terminali paulo brevioribus. Capitula solitaria vel perpauca, tenuiter pedunculata pedunculis pubescentibus circ.

5–10 cm. longis, radiata, pansa ad anthesin circ. 2.5–3.8 cm. lata et 8–11 mm. alta. Involucri bracteae exteriores circ. 8, lanceolato-lineares vel oblongo-lineares, facie dorsali longitudinaliter valde 3-nervatae, apice subobtusae, marginibus et facie ventrali albido-hispidae; interiores late oblongo-lanceolatae, longiores, glabratae, acutiusculae. Flores ligulati circ. 8, aurantiaci, ligula oblongo-elliptici vel oblongo-oblanceolati, apice denticulati, ±1.5 cm. longi. Paleae lanceolatae vel sursum abrupte ad apicem et deorsum sensim ad basim angustatae, apice saepe eroso-dentatae, dorso hispidae ventre glabrae, ±5 mm. longae. Florum tubulosorum styli rami apice breviter acriterque conici. Achaenia atra, oblonge lineari-lanceolata, valde obcompressa, longitudinaliter multistriata, marginibus et ventre (saepe etiam ad tergi costam medianam) dense erecto-hispida pilis albidis elongatis sericeis et basi papillatis, corpore circ. 4.5–5.5 mm. longa et circ. 1.2–1.5 mm. lata, apice plus minusve setoso biaristata aristis linearibus antrorsum hispidis circ. 2 mm. longis.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, locality uncertain but suspected by Kunth as being in the Peruvian Andes. Type should be among the Humboldt and Bonpland specimens at Paris.

Distribution: Southernmost Ecuador and perhaps adjacent Peru.

Specimens examined: *Ed. André 4387*, cold region, Catamayo, Province of Loja, Ecuador, October 31, 1876 (Kew); *William Jameson*, hills near Loja, Ecuador, commun. anno 1865 (Kew); *J. N. Rose, A. Pachano, & George Rose 23146*, vicinity of Zaragura, Ecuador, September 28, 1918 (Gray; N.Y.; U.S.); *Berthold Seemann 675*, Loxa (Loja), Ecuador, August, 1847 (Kew).

34. **Coreopsis triloba** Blake, Contr. U. S. Nat. Herb. 22: 643. 1924.

Fruticosa, erecta, caule ramisque gracilibus dense foliatis terminos versus primo piloso-tomentosis mox glabratis, internodiis plerumque 2–8 mm. longis interdum longioribus (quidem 2 cm.). Folia opposita, petiolata petiolis 1–2 cm. longis basi in poculum 0.5–1 mm. altum connatis, petiolo adjecto 2–4 cm. longa, glabra, raro integra linearifiliformiaque plerumque tripartita segmentis coriaceis lineari-filiformibus apice subulatis integris vel mediano interdum 3-partito, ultimis 0.3–0.8 mm. latis. Capitula pauca (plerumque 1–3 ad unicum ramulum), tenuiter pedunculata pedunculis primo piloso-tomentosis demum glabratis, 1–6 cm. longis, radiata, pansa ad

anthesin circ. 1.5 cm. lata et 6–8 mm. alta. Involucri bracteae circ. 8, lanceolatae vel lanceolato-ovatae, obtusiusculae, crasso-herbaceae, adpressae vel parce laxae, longitudinaliter 3-vittatae, glabrae, circ. 2.5–3 mm. longae et 0.8–1.2 mm. latae; interiores oblongo-ellipticae, obtusae, glabrae, circ. 5–6 mm. longae. Flores ligulati forsitan 8, flavi, ligula elliptico-oblongi, apice denticulati, ±6 mm. longi. Paleae immaturae acutiusculae, apice spinuloso-ciliatae. Achaenia (valde immatura) obcompressa, ciliolata, biaristata aristis paleolis similibus antrorsum hispido-ciliatis 0.8 mm. longis.

Type specimen: Collected by *William Jameson* in Ecuador (U.S., 2 sheets).

Distribution: Ecuador and Peru.

Specimens examined: *Const. De Jelski 705*, Cutervo, Peru, May, 1879 (Berl., 2 sheets); *Jameson*, Ecuador (2 type sheets, U.S.); *E. P. Killip & A. C. Smith 22171*, open rocky hillside, alt. 3150 meters, Mantaro Canyon, south of Huancayo, Department of Junín, April 29, 1929 (Field; forma foliis plus minusve atypicis); *A. Raimondi 3022*, Cutervo, Province of Cutervo, Department of Cajamarca, Peru, May, 1879 (Berl.).

35. **Coreopsis spectabilis** A. Gray, Proc. Amer. Acad. 5:125. 1861.

Suffrutex saltem 3–4.5 dm. altus, caulibus glaberrimis, teretibus, striatis, internodiis 2–6 cm. longis et circ. 1.5–2 mm. crassis. Folia opposita, tenuiter petiolata petiolis 0.5–2 cm. longis basaliter in poculum hyalinum circ. 1–1.3 mm. altum connatis, petiolo adjecto 3–6 cm. longa, 2–3-pinnatisecta, segmentis ultimis planis, glabris, acriter indurato-apiculatis, plerumque 0.5–0.8 mm. latis. Capitula perspicue pedunculata pedunculis glaberrimis (inferne 1-bracteatis vel saepius foliatis 2–3 jugis foliorum) 2.2–2.7 dm. longis, radiata, pansa ad anthesin ±4 cm. lata et 6–8 mm. alta. Involucri bracteae glaberrimae, exteriores 6–8, late lineari-oblongae, apice obtusae, 4–5.5 mm. longae et 0.9–1.5 mm. latae; interiores anguste ovatae, 1–1.2 cm. longae. Flores ligulati (forsan 8), flavi, ligula obovati, apice obscure denticulati, circ. 1.5–1.8 cm. longi et ±1 cm. lati. Paleae oblanceolatae, apicaliter obtusae, dorsaliter (ad margines glabrae aliter) sursum sericeo-pilosae, ventraliter glabrae, 6.5–8 mm. longae, unaquaque cum achaenio decidente. Achaenia valde obcompressa, nigra, oblanceolata, dorsaliter glaberrima, ventraliter (secundum costam medianam) ac marginaliter pilis sericeis albidisque perspicue surso-pilosa, ad latera subtilia, corpore 5.5–6.5 mm. longa et 2–2.3 mm. lata, apice biaristata aristis linearibus, stramineis, sursum sericeo-hispidis, parce patentibus, 2.5–3 mm. longis.

Type specimen: Collected by *McLean*, in the Andes Mountains of Peru (Kew).

Distribution: Peru.

Specimen examined: *McLean*, Andes Mountains, Peru (type, Kew).

36. **Coreopsis suaveolens** Sherff, Bot. Gaz. 89: 369. 1930.

Frutex ramosus, verisimiliter 5–8 dm. altus, ramis subteretibus plerumque glabratis sed hac illac glutinosis odore *Covilleae divaricatae* (Cav.) Vail suaveolentibus. Folia opposita fasciculata, primaria 1.2–1.6 cm. longa, pinnatim 3–5-secta, plus minusve glutinosa, segmentis petiolis similibus vel rursus sectis, ultimis linearibus, glanduloso-hispidis, carnosis, apicaliter mucronatis, tantum 0.3–0.6 mm. latis. Capitula ramos superne nudos (pedunculos tenues) terminantia, solitaria, radiata, pansa ad anthesin ±2.3 cm. lata et 7–9 mm. alta. Involucri hispidi bracteae exteriores circ. 8, oblongae vel late lanceolatae, obtusae, 3–5 (–7) mm. longae, quam interiores oblongo-lanceolatae circ. 8 mm. longae saepius dimidio breviores. Flores ligulati circ. 6, lutei, ligula oblongo-elliptici, apice integri vel (etiam profunde) bifidi, 7–11 mm. longi. Disci florum stigmata brevia, abrupte incrassata truncataque. Achaenia ignota. Habitu *C. fasciculatae* Wedd. valde similis.

Type specimen: Collected by *Erich Werdermann*, No. 1114, at altitude of about 3,800 meters, Cordillera de Lallinca, Province of Tarapacá, Department of Tarapacá, Chile, March, 1926 (Gray).

Distribution: Known only from type locality in Chile.

Specimens examined: *Werdermann 1114* (type, Gray; cotypes, Field; Stockh.; Calif.). The label on the Field Museum sheet says "Cord. Co. Columfusca, Apacheta, Prov. Tarapacá. . . ."

37. **Coreopsis Pickeringii** A. Gray, Proc. Amer. Acad. 5: 124. 1861. *Coreopsis Boliviana* Blake, Contr. U. S. Nat. Herb. 22: 644. 1924.

Frutex fere glaberrimus vel praecipue caule ramisque plus minusve hispidus, 6–10 dm. altus, internodiis plerumque 1–4 cm. longis. Folia opposita petiolata petiolis tenuibus usque ad 2 cm. longis, basi in poculum membranaceum saepe 4 mm. altum connatis, petiolo adjecto 2–3.5 cm. longa, ternatisecta, foliolis 3–5-sectis, segmentis glabris, crassiusculis, linearibus, eciliatis, acriter apiculatis, usque ad 1 cm. longis et 0.6–1.5 mm. latis, quam rhachi tenui vix latioribus. Capitula longe tenuiterque pedunculata pedunculis usque ad 1.5

(rarius 2.3) dm. longis, radiata, pansa ad anthesin 3.5–4 (–5) cm. lata et 0.9–1.1 cm. alta. Involucri hispidi bracteae exteriores circ. 8, late lineari-oblongae, apice obtusae, dorso glabrae hispidaeve, marginibus longe ciliatae, circ. 5 mm. longae et 1–2 mm. latae; interiores oblongo-lanceolatae, flavo-marginatae, multistriatae, circ. 1 cm. longae et 3–3.5 mm. latae. Flores ligulati 8 vel 9, flavi, ligula anguste obovati, apice rotundati et integri vel obscure denticulati, 1.5–2.4 cm. longae et 4–9 mm. lati. Paleae oblongae, apice obtusissimae vel truncatae et saepe eroso-dentatae, exteriores dorso villosae, circ. 7–8 mm. longae. Disci florum stigmata ovoidea, breviter apiculata. Achaenia oblongo-oblanceolata, plana, atra, dorso sub palea plus minusve glabra ventre et praesertim marginibus sursum villosissima, corpore 5.5–6.5 mm. longa et circ. 1.1–1.3 mm. lata, apice biaristata aristis sursum hispidis circ. 2 mm. longis.

Type specimen: Collected by the *United States Exploring Expedition* under *Captain Wilkes*, high in the Andes above Obrajillo, Department of Lima, Peru (U.S.).

Distribution: Peru and Bolivia.

Specimens examined: *Otto Buchtien 97*, alt. 3,750 meters, dry slopes, La Paz, Bolivia, June 18, 1906 (Field); *J. Francis Macbride 2932*, alt. about 2,400 meters, on southeastern rock slide, Matucana, Peru, March 14–18, 1923 (Field; U.S.); *idem & Featherstone 210*, alt. about 2,400 meters, rock outcrop on northern slope, Matucana, Peru, April 12–May 3, 1922 (Field); *Francis W. Pennell 14342*, forming large clumps on open, rocky slope, alt. 2,700–2,900 meters, Canta, Department of Lima, Peru, June 11–19, 1925 (Field); *H. H. Rusby 1685*, alt. 3,000 meters, near La Paz, Bolivia, October, 1885 (type collection of *C. boliviana* Blake; Field; Gray; N.Y.); *U. S. Explor. Exped.* under *Capt. Wilkes*, above Obrajillo, Peru (type U.S.).

38. **Coreopsis imbricata** Sherff, Bot. Gaz. 89: 370. 1930.

Frutex 6–12 dm. altus, caule ramisque glabris, striatis, ramulorum internodiis numerosis saepius tantum 2–10 mm. longis. Folia opposita, petiolata petiolis tenuibus basi vix connatis circ. 1 cm. longis, petiolo adjecto circ. 2–2.5 cm. longa, ternatim bipinnatisecta, segmentis linearibus, crassiusculis, glabris, eciliatis, acriter apiculatis, 2–8 mm. longis et circ. 0.3–0.6 mm. latis. Capitula ramulos terminantia (vix manifeste pedunculata), radiata, pansa ad anthesin 3.5–4.5 cm. lata et 1–1.2 cm. alta. Involucri villosi bracteae exteriores circ. 16, biseriales, late lineari-oblongae, apice obtusae, 6–7 mm. longae et 1.1–1.5 mm. latae; interiores ovatae, flavo-marginatae,

obtusae, 1–1.1 cm. longae. Flores ligulati circ. 8, flavi, ligula oblongo-elliptici, apice integri vel subintegri, 1.8–2.4 cm. longi et 6–7 mm. lati. Paleae lineares, circ. 5-striatae, apice obtusae et denticulatae, ±8 mm. longae et ±0.5 mm. latae. Disci florum stigmata caudato-apiculata. Achaenia lineari-oblanceolata, plana, atra, dorso glabra, ventre ac marginibus ac apice sursum villosa, corpore ±5 mm. longa et ±1.4 mm. lata, biaristata aristis sursum hispidis ±2.7 mm. longis.

Type specimen: Collected by *R. Pearce*, altitude 3,600 meters, Cordillera Huanta (midway between Lima and Cuzco), Peru, February, 1867 (Kew).

Distribution: Known only from type locality.

Specimens examined: *Pearce*, Cordillera Huanta (type, Kew).

Close to *Coreopsis Pickeringii* Gray, from which it differs in its numerous, much shorter internodes, its lack of elongate peduncles, the caudate-tipped stigmas of its disc florets, its double outer involucre the bracts of which are larger, etc.

39. **Coreopsis Townsendii** Blake, Contr. U. S. Nat. Herb. 22: 643. 1924.

Fruticosa, forsitan 4–7 dm. alta, caule gracili, tetragono, subviridi, glabro, ramis erectis. Folia opposita, petiolata petiolis basi connatis 1–2.5 cm. longis, petiolo adjecto 2–5 cm. longa, pinnatim 3–5-partita segmentis integris linearibus acutis coriaceis unicostatis glabris vel inferne ad costam sparsim obscureque pubescentibus 7–23 mm. longis et 1–1.8 mm. latis. Capitula solitaria vel perpauca, tenuiter pedunculata pedunculis laxe (ad capitulum dense) pilosis circ. 1–5.5 cm. longis, radiata, pansa ad anthesin 2.5–3.4 cm. lata et ±7 mm. alta. Involucri bracteae exteriores circ. 6, lineari-oblongae, obtusae vel rotundatae, 3-vittatae, inferne ciliatae aliter glabrae, circ. 4–4.5 mm. longae et circ. 1–1.2 mm. latae; interiores elliptico-oblongae, apice obtuso eroso-ciliatae, ±8 mm. longae et ±2.5 mm. latae. Flores ligulati 8, flavi, ligula anguste oblongo-obovati, ±14 mm. longi et ±7 mm. lati. Paleae oblongae, apice eroso-ciliatae, dorso infra mediane erecto-pilosae, circ. 3.3–4 mm. longae. Flores tubulosi flavi, tubi apice glandulo-puberuli, gutture campanulato-infundibuliformi superne sparsim pilis multiloculatis piloso; stylorum ramis termino deltoideis et obtusiusculis. Achaenia submatura oblonga, valde obcompressa, atra, ventris costa mediana plus minusve erecto-pilosa, tergo glabra, dense longeque erecto-ciliata, corpore circ. 3.5 mm. longa, apice biaristata aristis (immaturis) lanceolatis, trigonis, dense antrorsumque hispidis, ±1.3 mm. longis.

Type specimen: Collected by *Charles Henry Tyler Townsend*, No. *A192*, at altitude of 1,950–2,250 meters, Huascaray, Peru, September 10, 1911 (Field).

Distribution: Bolivia and Peru.

Specimens examined: *K. Fiebrig 3476*, alt. 3,200 meters, Jaipa, Bolivia, February 20, 1904 (Berl., 2 sheets); *Townsend A192* (type, Field).

40. **Coreopsis fasciculata** Wedd. Chlor. And. 1: 71. 1855. *Coreopsis Matthewsii* A. Gray, Proc. Amer. Acad. 5: 124. 1861.

Involucra plus minusve tomentosa.....*C. fasciculata* sensu stricto.

Involucra glaberrima vel basi vix sparso-hispida...var. *β laevigata.*

Frutex circ. 7.5 cm. altus, caule ramisque glaberrimis vel interdum pubescentibus, angulato-striatis, parce subtetragonis, internodiis saepius 1–3 cm. (ramulorum saepius 2–7 mm.) longis. Folia opposita (illa ramulorum sterilium subfasciculata), petiolata petiolis tenuibus 6–10 mm. longis, inferne saepe ciliatis raro resinosis basi in poculum 1–3 mm. altum connatis, petiolo adjecto 1.3–2 cm. longa, tripartita, foliolis 2–3-fidis, segmentis linearibus, vix membranaceis, plerumque glabratis, apice apiculatis, 1–7 mm. longis et 0.4–1.2 mm. latis. Capitula ramulos (in pedunculos superne tomentosos 1–12 cm. longos productos) terminantia, radiata, pansa ad anthesin 2.3–2.8 cm. lata et 8–10 mm. alta. Involucri plus minusve tomentosi bracteae exteriores 6–8, spathulato-lanceolatae vel lineari-lanceolatae, apice obtuso saepe rotundatae, 1.3–5 mm. longae et 0.5–2 mm. latae; interiores lanceolatae, saepius flavo-marginatae, circ. 1 cm. longae. Flores ligulati circ. 7 vel 8, flavi, ligula elliptico-oblongi vel anguste obovati, apice subintegri, 1–1.5 cm. longi. Paleae lineari-oblanceolatae, apice laciniato-denticulatae, dorso villosae, circ. 6 mm. longae. Disci florum stigmata parce caudato-apiculata. Achaenia lineari-oblanceolata, plana, dorso sub palea glabra, ventre marginibusque sursum villosa, corpore circ. 5 mm. longa et circ. 1 mm. lata, biaristata aristis sursum villosis circ. 2 mm. longis.

Type specimen: Collected by *Claude Gay* in Peru (Par.).

Distribution: Ecuador (where apparently rare) to Peru and Bolivia.

Specimens examined: *J. Ball*, alt. 3,600–3,900 meters, rocky places near Chicla, Peru, April 21–23, 1882 (Kew); *A. Bonpland*, equatorial America (Par., sub nom. *Coreopside Matthewsii* A. Gray); *Otto Buchtien 595*, alt. 3,300 meters, lower half of Obrajes, La Paz, Bolivia, May 13, 1919 (Field, 2 sheets; Gray); *A. E. Douglas*, Arequipa, Peru,

1892 (Gray); *Mr. & Mrs. F. E. Hinkley 51*, ravines at about 2,700 meters, southern slopes of Chachani Mountain, north of Arequipa, Peru, March, 1920 (Gray); *Hrdlicka*, alt. 2,400–3,000 meters, western Cordillera, vicinity of San Damián, Peru, January–February, 1913 (U.S.); *E. P. Killip & A. C. Smith 21536*, straggling shrub, 2–4 ft. high, alt. 3,000–3,500 meters, open hillside, Río Blanco, Department of Lima, Peru, April 15–17, 1929 (Field); *iidem 23304*, up to 3 ft. high, alt. 4,200 meters, open hillside between Huanta and Hacienda Pargora, Department of Ayacucho, Peru, May 2–19, 1929 (Field); *Macbride & Featherstone 436*, alt. about 2,400 meters, rocky, grassy summit slope, Matucana, Peru, April 12–May 3, 1922 (Field); *iidem 690*, alt. about 3,600 meters, rocky places, Río Blanco, Peru, May 8–19, 1922 (Field); *iidem 1237*, alt. about 3,000 meters, rocky southwestern canyon slope, Yanahuanca, Peru, June 16–22, 1922 (Field); *Alexander Mathews 571*, Purrochuca and Obrajillo, Peru, April to July (Kew; the basis of *C. Matthewsii* A. Gray); *F. W. Pennell 13244*, alt. 2,800–2,900 meters, rocky ravine above Arequipa, Peru, April 7–16, 1925 (N.Y.); *idem 14396*, alt. 2,800–3,200 meters, open, rocky slopes, along Río Chillón, above Obrajillo, Department of Lima, Peru, June 13–23, 1925 (N.Y.); *idem 14710*, alt. 3,300–3,500 meters, Huaros, Department of Lima, Peru, June 23, 1925 (N.Y.); *C.S. Sargent 27*, above Chicla, Peru, December 26, 1905 (U.S.); *C. Troll 3157*, Paychama, Chile, March 9, 1927 (Berl.); *Warszewicz 37*, Ecuador (Berl.); *August Weberbauer 203*, rocky places above 3,000 meters alt., Huillacachi, southwest from Matucana, Peru, December 28, 1901 (Berl.); *idem 2394* pro parte, alt. 3,300–3,500 meters, Tarma, Department of Junín, Peru, February 10, 1903 (Berl.); *idem 5764*, alt. 3,100 meters, between the Río de Lomas and the Río Yauca (15° 10′–15° 20′ S. Lat.), May 15, 1911 (Berl.; Field); *idem 5782*, alt. 3,300 meters, south from Chavina, Province of Tarinacochas, Department of Ayacucho, Peru, May 16, 1911 (Berl.; Field).

Coreopsis fasciculata var. *β* **laevigata** Sherff, Amer. Journ. Bot. 22: 707. 1935.

Foliorum segmenta saepius lineari-spathulata vel anguste oblongo-oblanceolata, involucris glaberrimis vel basi vix sparso-hispidis.

Type specimen: Collected by *Fortunato L. Herrera*, No. 111, at altitude of 3,400–3,600 meters, Cuzco, Peru (Berl.).

Distribution: Southern Peru.

Specimens examined: *Herrera 111* (type, Berl.); *idem 391*, alt 3,200–3,600 meters, environs of Cuzco, November, 1924 (Berl.;

planta tinctoria, fide lectoris); *idem 1186*, alt. 3,500–3,600 meters, heights of Cuzco, November, 1926 (Berl.); *idem 1481* pro parte, alt. 3,350 meters, environs of Cuzco, March, 1927 (Gray; cum *Bidente andicola* var. *decomposita* O. Ktze. commixta).

41. **Coreopsis lanceolata** L. Sp. Pl. 908. 1753; Sims in Curtis, Bot. Mag. *pl. 2451*. 1823. *Bidens Caroliniana, florum radiis latissimis, insigniter dentatis*, etc. Martyn, Hist. Pl. Rar. 26 and *plate*. 1728. *Bidens succisae folio, radio amplo laciniato* Dillen. Hort. Eltham. Pl. Rar. Icon. et Nom. 55, *pl. 48, f. 56*. 1732. *Coreopsoides lanceolata* (L.) Moench, Meth. 594. 1794. *Coreopsis lanceolata* var. *glabella* Michx. Fl. Bor. Amer. 2: 137. 1803. *Leachia lanceolata* (L.) Cass. Dict. Sci. Nat. 25: 389. 1822. *Chrysomelea lanceolata* (L.) Tausch, Hort. Canal. *f. 1* (ex DC. Prodr. 5: 570. 1836). *Coreopsis lanceolata* var. *Succisaefolia* DC. Prodr. 5: 570. 1836. *Coreopsis lanceolata* var. *angustifolia* Torr. & Gray, Fl. N. Amer. 2: 344. 1843. *Bidens caroliniana* Hemsl. in Curtis, Bot. Mag. 27, index. 1906.

Glabra vel foliorum basibus ciliolata.....*C. lanceolata* sensu stricto.
Pubescens vel hirsuta.....var. *β villosa*.

Herba perennis, 2–6 dm. alta, caulibus erectis vel adscendentibus, teretibus vel subangulatis, glabris, ramosis, basim versus foliosis, superne subnudis ac maxime elongatis (in pedunculos desinentibus). Folia opposita, glabra vel basi ciliata, plerumque 5–15 cm. longa, superiora sessilia inferiora saepius longe tenuiterque petiolata petiolis laminas interdum superantibus, nunc spathulata nunc linearia vel lineari-lanceolata nunc lineari-oblanceolata, plerumque simplicia raro 1–2 lobis parvis lateralibus divisa. Capitula radiata, pansa ad anthesin 3–6 cm. lata et 1–1.4 cm. alta. Involucri bracteae exteriores 8–10, lanceolatae vel oblongo-ovatae, glabratae vel apice pubescentes, 4–8 mm. longae; interiores lanceolato-ovatae vel oblongo-ovatae, 8–12 cm. longae. Flores ligulati circ. 8, flavi, ligula obovati vel cuneati, apice 3-lobati lobo mediano plerumque 2–3-dentato, 1.3–3 cm. longi. Paleae inferne oblongo-lineares superne filiformes, 4–6 mm. longae. Florum tubulosorum stylorum rami caudato-appendiculati. Achaenia obcompressa, alata, circumambitu (alis paululum incurvatis inclusis) orbiculata, 2.3–3 mm. longa, corpore atra, ventre gibbis callosis saepe perspicue munita ac saepe tuberculata vel setis nunc superne sensim dilatatis nunc apice capitatis setosa, apice dentibus parvis fimbriolatis bidentata.

Type specimen: No specimen cited. The Linnean concept rested upon such clear and unmistakable illustrations as those given by Martyn (loc. cit.) and by Dillenius (loc. cit.).

Distribution: Michigan and Lake Superior southward to Florida, Alabama, Louisiana, southeastern Texas, and northern New Mexico; widely cultivated for ornament and occasionally escaping; apparently becoming established in eastern China.

Specimens examined: *Anon.*, Florida (Gray; var. *angustifolia* Torr. & Gray, an official specimen for the treatments in Torr. & Gray, loc. cit. and Gray, Syn. Fl. loc. cit.); *H. C. Benke 3183*, Miller, Indiana, May 22, 1922 (Field); *J. M. Bigelow*, Fort Smith, Arkansas to the Rio Grande, along 35th parallel of latitude, 1853–1854 (N.Y.); *Biltmore Herb. 2067a*, dry soil near Apalachicola, Florida, May 2, 1883 (Gray); *Dr. Boykin*, Georgia (Gray; N.Y.); *M. A. Brannon*, near Crown Point, Indiana, 1889 (Field); *Brendel*, Illinois (Berl., 2 sheets); *Mason Bross*, Hyde Park, Chicago, Illinois, June 3, 1878 (Field); *S. H. & D. R. Camp*, Bay View, Michigan, July 14, 1896 (Field); *H. C. Cheo & W. F. Wilson 11* p.p., near house, Mo Kan Shan, Province of Chekiang, China, June 19, 1926 (Calif., 2 sheets); *Hubert Lyman Clark*, Falmouth Road, Woods Hole, Massachusetts, August 16, 1899 (Gray); *A. H. Curtiss*, Pensacola, Florida, 1885 (N.Y.); *idem 1481*, dry pine woods, near Aspalaga, Florida, April (var. *villosae* adpropinquans; Berl., 2 sheets; Field, 2 sheets; Gray); *Arthur W. De Selm 140*, west of Kankakee, Illinois, June 1, 1913 (Field); *Royal A. Dixon 528*, vicinity of Huntsville, Texas, May 6–12, 1910 (Field; var. *angustifolia* Torr. & Gray); *idem & Cornelia Gage 713*, Morgan Park Ridge, Illinois, May 27, 1907 (Field); *C. W. Duesner*, Pine, Indiana, 1908 (Field); *F. S. Earle & C. F. Baker 243*, Auburn, Alabama, May 8, 1897 (Field); *H. Eggert*, rocky hills, Jefferson County, Missouri, May 20, 1887 (Gray); *idem*, eodem loco, May 25, 1896 (Gray); *J. H. Ehlers 518*, dry, sandy soil, near Cecil Bay, Emmet County, Michigan, July 14, 1917 (Gray); *George Engelmann*, prairies, vicinity of East St. Louis, Illinois, May, 1845 (Berl.); *Frank C. Gates 508*, Ravenswood, Chicago, Illinois, June 23, 1905 (Field); *idem 2478*, sandy soil, Waukegan, Illinois, June 8, 1908 (Field); *idem & M. T. Gates 10547*, along sandy road, Cecil Bay, Emmet County, Michigan, July 14, 1917 (Field); *Jesse M. Greenman 2017*, sandy soil near Lake Michigan, Beach, Illinois, June 16, 1907 (Gray); *idem 2592*, Dune Park, Indiana, June, 1910 (Gray); *Dr. Hale*, Louisiana, 1842 (Gray); *Elihu Hall*, sandy barrens, Athens, Illinois, 1861 (Gray, cum var. *villosa* commixta, sed alibi tantum species ipsa); *Roland M. Harper 22*, Screeton, Arkansas, May 1, 1923 (Gray); *herb. Hexamer & Maier*, rich woods, June 16, 1855 (Gray); *E. J. Hill*, dry grounds, Morgan Park, Chicago,

Illinois, June 17, 1876 (Field); *Albert S. Hitchcock*, Madison County, Florida, June–July, 1898 (Field); *Hort. Berol.*, September, 1832 (Berl.); *Mary E. Hutchinson*, Randolph, Wisconsin (Field); *L. N. Johnson*, sandy ridges in woods, Chicago, Illinois, June 19, 1891 (Gray); *A. B. Langlois*, western Louisiana, April, 1880 (Field); *O. E. Lansing, Jr. 848*, along railroad, Clarke, Indiana, May 31, 1900 (Field); *idem 935*, eodem loco, June 20, 1900 (Field); *idem 2715*, swale near railroad, Indiana Harbor, Indiana, June 17, 1908 (Field); *idem 2782*, eodem loco et tempore (Gray, var. *villosae* adpropinquans); *I. A. Lapham*, Milwaukee, Wisconsin (Gray); *Le Conte*, North America (Berl.); *George W. Letterman*, top of sandhill near Franklin County Road Bridge, Missouri, July, 1883 (Mo.); *C. O. Levine 778*, Honam Island, Kwang-Tung Province, China, May 12, 1917 (Gray; Mo.); *L. H. Lighthipe*, Monticello, Florida, April 5, 1891 (Field); *F. Lindheimer*, wet woods west of Houston, Texas, early May, 1840 (Berl.); *Ray N. Lloyd*, rich or damp soil, Ravenswood, Chicago, Illinois, June 3, 1887 (Field); *Loring*, Lake Superior (Gray); *W. H. Manning*, Mackinac Island, Michigan, July 11, 1915 (Gray); *F. E. McDonald*, dry, gravelly slopes, Peoria, Illinois, June, 1899 (Field); *idem*, high, dry hills overlooking Horse Shoe Bottom, Peoria, June, 1904 (Gray); *idem*, high, gravelly hills, Peoria, June, 1915 (Field) and June, 1916 (Field); *S. B. Mead*, Mason County, Illinois, June 18, 1845 (Field; var. *angustifolia* Torr. & Gray); *W. S. Moffatt 105*, sandy thickets, Chicago, Illinois, June, 1895 (Berl.; Gray); *H. F. Munroe*, Hyde Park, Chicago, Illinois, May (Field) and June, 1879 (Field); *E. J. Palmer 17*, cherty barrens, Newton County, Missouri, July 1, 1906 (Gray); *idem 2386*, cherty barrens, Reding's Mill, Missouri, July 1, 1909 (Gray); *idem 2386A*, eodem loco et tempore (Gray); *A. S. Pease 17993*, damp, sandy beach, Bailey's Harbor, Door County, Wisconsin, June 18, 1921 (Gray); *S. F. Poole*, Sharon, Massachusetts, July, 1905 (Gray); *Thomas C. Porter*, banks of Savannah River, near Augusta, Florida, April, 1847 (Gray); *P. H. Rolfs 309*, Tallahassee, Florida, April 20, 1895 (Field); *B. F. Saurman*, rich, grassy plains, Apalachicola, Florida (Field; var. *angustifolia* Torr. & Gray); *F. Scammon*, Chicago, Illinois, June, 1859 (Field) and June 3, 1859 (Field); *A. K. Schindler 345a*, alt. 1,100 meters, Lu-shan, Kuling Mountains, Province of Kiangsi, China, August-September, 1908 (Berl.); *J. H. Schuette*, Door, Wisconsin, July 30, 1887 (Field, 2 sheets); *idem*, shore of Lake Michigan north of Sturgeon Bay Canal, Wisconsin, July 14, 1890 (Field); *Earl E. Sherff 5006*, cult. in Harvard Univ. Bot. Gard., August 12, 1929 (Berl.; Brit.; Field); *H. C. Skeels 304*, Joliet, Illinois, June

21, 1904 (Field); *Paul C. Standley 4410*, alt. about 2,460 meters, hillside near Cowles, Pecos River National Forest, New Mexico, July 19, 1908 (Gray); *A. N. Steward*, open hillside, Lu-shan, Kuling, Province of Kiangsi, China, July 27, 1922 (Calif.); *idem 1518*, in open, Kikungshan, Province of Honan, China, July 24, 1925 (Calif.); *idem 1583*, damp meadow, eodem loco, July 27, 1925 (Calif.); *W. F. Thurrow*, Hockley, Texas, 1890 (Field); *S. M. Tracy 9454*, St. Andrews, Florida, April 29, 1908 (Gray); *idem & Lloyd 508*, Virginia, August 15, 1910 (Field; Gray); *L. M. Umbach*, dry sands, Miller, Indiana, June 5, 1897 (Field); *idem*, sands, Clarke, Indiana, June 4, 1898 (Field); *H. E. Wheeler 82*, near Hazen, Grand Prairie, Arkansas, May 22, 1924 (Field); *H. N. Whitford 64* and *203*, waste fields, Cold Spring Harbor, New York, August, 1903 (Field); *Emile F. Williams*, self-sown and thriving, Concord, Massachusetts, June 20, 1908 (Gray); *Wilbur H. Wright 50*, Miller, Indiana, July 2, 1908 (Field).

Coreopsis lanceolata var. *β* **villosa** Michx. Fl. Bor. Amer. 2: 137. 1803. *C. crassifolia* Dryand. in Ait. Hort. Kew. ed. 1. 3: 252. 1789; non Sessé & Moc. Fl. Mex. ed. 2. 194. 1894. *C. oblongifolia* Nutt. Journ. Acad. Phila. 7: 76. 1834. *C. lanceolata* var. *crassifolia* Ait. ex Heynhold, Nomencl. 219. 1840.

E specie planta omnino vel fere usque ad summam pubescente differt.

Type specimen: Collected by *André Michaux* in Carolina (Par.).

Distribution: South Carolina, Illinois, Missouri, and western Arkansas, southwardly to Florida, Alabama, and Louisiana; elsewhere probably introduced.

Specimens examined: *Anon.*, Tampa Bay, Florida (Gray); *H. H. Babcock*, Chicago, Illinois, June 17, 1874 (Field); *J. M. Bigelow*, Fort Smith, Arkansas, June 23, 1853 (N.Y.); *Biltmore Herb. 5693b*, dry soil, Spartanburg, South Carolina, May 12, 1897 (Gray); *B. F. Bush 84*, common in barrens, Eagle Rock, Missouri (Gray); *William M. Canby 55*, Columbia, South Carolina, May 9, 1899 (Gray); *A. W. Chapman*, middle Florida (Field); *A. H. Curtiss 6390*, old field near River Junction, Florida, May 2, 1898 (Gray); *H. Eggert*, stony hills, Jefferson County, Missouri, June 10, 1891 (Gray; Mo.); *idem*, Hematite, Missouri, May 25, 1896 (Calif.; Field; U.S.); *herb. George Engelmann*, Aiken, South Carolina, April, 1882 (Mo.); *Frank C. Gates 942*, Chicago, Illinois, June 24, 1905 (Field); *idem 2817*, Beach, Illinois, July 1, 1908 (Field); *C. A. Geyer*, Beardstown, Illinois (Mo., 2 sheets); *Grassly*, Hyde Park, Chicago, Illinois, June 10,

1877 (Field); *Dr. Hale*, Louisiana (Field; Gray); *E. J. Hill 1108*, top of limestone ledge, Lockport, Illinois, June 14, 1899 (Field); *idem 2746*, eodem loco et tempore (Gray); *G. G. Kennedy*, dry pine woods, Ormond, Florida, March 29, 1897 (Gray); *O. E. Lansing, Jr. 243*, waste ground, Hyde Park, Chicago, Illinois, June 14, 1898 (Field); *G. W. Letterman*, Allenton, Missouri, August, 1883 (Gray); *idem*, Morely, Missouri, July, 1884 (Mo., 2 sheets); *F. E. McDonald*, high, dry hills, Peoria, Illinois, May, 1915 (Field); *Mrs. J. M. Milligan*, Jefferson County, Missouri (Field); *E. J. Palmer 27056*, rocky, open ground, along stream near Berryville, Arkansas, May 7, 1925 (Gray); *H. W. Ravenel*, Santee Canal, South Carolina (Gray); *F. Scammon*, Chicago, Illinois (Field); *Earl E. Sherff 5013*, cult. in Harvard Univ. Bot. Gard., August 12, 1929 (Brit.; Calif.; Field); *idem 5014*, cult., eodem loco et tempore (Field; Kew); *idem 5016*, cult., eodem loco et tempore (Calif.; Field; Kew; N.Y.; U.V.); *Mary F. Spencer 1114*, alt. 300 meters, ditch near San Bernardino, California, May 9, 1919 (Gray); *E. F. Williams*, well established, Wickford, Rhode Island, June 17, 1908 (Gray); *R. E. Woodson, Jr. & E. S. Anderson 1545*, Birmingham, Alabama, April 20, 1927 (Mo.).

42. **Coreopsis corninsularis** Sherff, Bot. Gaz. 94: 597. 1933.

Herba perennis, erecta, gracilior, caulibus tenuibus angulatis glabris 2 vel 3 ex unico basi circ. 3–4 dm. altis. Folia opposita, plus minusve petiolata petiolis tenuibus usque ad 3 cm. longis basi sparsim hispido-ciliatis, petiolo adjecto plerumque 3–8 cm. longa et 1–6 mm. lata, saepius integra anguste vel late spathulato-linearia crassiuscula faciebus glabra marginibus ciliata apice subacuta vel subobtusa, interdum 3–5-partita foliolis lateralibus multo minoribus et tantum 1–2 mm. latis. Capitula solitaria longe pedunculata pedunculis tenuibus glabris 1–1.8 dm. longis, radiata, pansa ad anthesin 3–5 cm. lata et 10–12 mm. alta. Involucri glabri bracteae exteriores 8–10, lanceolatae vel oblongo-lineares, 3–5 mm. longae; interiores ovato-oblongae, demum circ. 1 cm. longae. Flores ligulati circ. 8, flavi, ligula oblongo-oblanceolati, apice saepius 3-lobati lobo mediano multo majore apice rursus in 2 dentes inciso, 1.5–2.5 cm. longi. Paleae tenuiter lineares, superne filiformes, 3–4 mm. longae. Flores tubulosi flavi, styli ramis terminaliter caudato-appendiculatis. Achaenia valde obcompressa, dorso convexa, nigra, corpore ipso oblongo, 2.5–3.2 mm. longa et (alis exclusis) 1.2–1.5 mm. lata, faciebus glabra vel glabrata, marginibus alata alis expansis membranaceis quam corpore saltem 0.5–0.75 angustioribus, apice papposa 2 fimbriatis squamellis circ. 0.1–0.2 mm. longis.

Type specimen: Collected by *Samuel Mills Tracy*, No. 8542, on Horn Island, Mississippi, May 25, 1903 (Mo.).

Distribution: Known only from type locality on Horn Island, Mississippi.

Specimens examined: *Tracy 8542* (type, Mo.; cotype, Field).

43. **Coreopsis debilis** Sherff, Bot. Gaz. 89: 366. 1930.

Herba perennis, caulibus saepius 2–6, e radice lignescenti erectis, tenuissimis, angulatis, glabris, 3–6 dm. altis. Folia opposita, membranacea, petiolata petiolis tenuibus usque ad 2 cm. longis, lamina nunc indivisa linearia vel parce lineari-oblanceolata margine integra ciliataque apice vix acuta basim versus sensim angustata faciebus saepe aegre hispida petiolo adjecto 2–5 cm. longa et 1–5 mm. lata; nunc majora, petiolo saepe 3.5 cm. longo adjecto 7–9 cm. longa, aegre pinnata (raro etiam subbipinnata) segmentis lateralibus plerumque 1–2 jugis, quam terminali minoribus, linearibus vel subfiliformibus. Capitula pauca vel numerosa, tenuiter pedunculata pedunculis 1–2 (–3) cm. longis, radiata, pansa ad anthesin circ. 2–2.5 cm. lata et circ. 7–9 mm. alta. Involucri saepius glabrati bracteae exteriores circ. 8, lineares lanceolataeve, apice acutae vel obtusae, margine ciliatae, basim versus saepe scariosae, 3–4 mm. longae; interiores lanceolatae vel ovato-lanceolatae, 7–8 mm. longae. Flores ligulati flavi, ligula cuneato-obovati, apice saepius 4-dentati dentibus acutis, circ. 1 cm. longi. Paleae lineares, superne angustissime elongatae. Disci florum stigmata terminaliter caudata. Achaenia obcompressa, tergo papillato-rugoso convexa, corpore ipso atro circ. 2 mm. longa et circ. 1 mm. lata, marginibus anguste alata, apice 2-squamellata squamellis fimbriolatis; facie ventrali glabra vel papillato-scabra, supra infraque valde callosa.

Type specimen: Collected by *John Donnell Smith*, No. 602, in dry, sandy, old fields along coast of Mississippi Sound, Harrison County, Mississippi, September 15, 1885 (Field).

Distribution: Florida and Georgia westward to Mississippi.

Specimens examined: *A. H. Curtiss*, Pensacola, Florida, summer of 1885 (N.Y.); *F. E. Lloyd & S. M. Tracy 527a*, Gulfport, Mississippi, September 8, 1900 (N.Y.); *Charles Mohr*, dry, open, sandy hills, etc., eodem loco, July 4, 1874 (U.S., 2 sheets); *idem*, in woods, Cullman, Alabama, June 1, 1882 (Gray); *idem*, low, open places, Cullman, June, 1883 (U.S., 3 sheets); *idem*, dry hillsides, vicinity of Ashland, Bibb County, Alabama, June, 1883 (U.S.); *idem*, borders of woods and fields, dry openings, Mulberry River Valley, Blount County, Ala-

bama, June 6, 1883 (U.S.); *idem*, sandy soil in open copses, Columbus, Mississippi, June 4, 1888 (U.S.); *idem*, dry bald prairies, Gallion, Alabama, May 25, 1893 (U.S.); *Charles L. Pollard & William R. Maxon 496*, Lithonia, Georgia, August 12, 1900 (N.Y.); *John Donnell Smith 602* (type, Field; cotype, Gray).

A species more closely related to *Coreopsis lanceolata* L. and *C. grandiflora* Hogg. J. Donnell Smith had determined his plant as *C. lanceolata* var. *angustifolia* Torr. & Gray. That variety, however, has a very different habit, the plants being less branched and the leaves being basally clustered and almost always simple. Donnell Smith had shown Asa Gray his Mississippi material, and Gray had called it "a peculiar form" of *C. lanceolata* L. Mohr's material from Pensacola, Florida, likewise had been seen by Gray. Thus, one sheet bears a note stating: "Dr. Gray remarks: 'I have nothing like this. I suppose it may be an altered, coast form of *C. lanceolata*. But it is very peculiar.' " (This note is written on the back of a card which, by strong transmitted light, is seen to have been Donnell Smith's regular herbarium label. This would seem to indicate that Mohr and his contemporary had studied their several specimens mutually and had regarded them as identical.) This same sheet has Mohr's first determination, *Coreopsis lanceolata* var. *angustifolia*, but this he had subsequently crossed out and replaced with *C. grandiflora*. His other foregoing specimens all had been labeled by him as *C. grandiflora*. This interpretation was retained by him in his *Plant Life of Alabama* (Contr. U. S. Nat. Herb. 6: 805. 1901). From *C. grandiflora*, however, our plants differ in their more slender and wiry, less herbaceous stems, in the tendency for some entire stems to have minute, simple leaves (smaller than the simple leaves formed in *C. lanceolata*), and in the tiny achenes, which have the body proper about 2 mm. long and about 1 mm. wide, as against about 2.5 mm. long and about 1.4–1.8 mm. wide in *C. grandiflora*. (A similar or even more pronounced achenial difference separates *C. debilis* also from *C. lanceolata*. Furthermore, the achenes of *C. debilis* have narrow wings [0.2–0.5 mm. wide] while those of *C. grandiflora* and *C. lanceolata* have wings 1 mm. or so in width.)

44. **Coreopsis intermedia** Sherff, Bot. Gaz. 88: 299. 1929.

Herba erecta, plus minusve glabra, forsitan perennis, supra parce ramosa, ±6 dm. alta, caule subtereti vel moderatim angulato, sulcato. Folia opposita, simplicia, basalia longe tenuissimeque petiolata petiolis usque ad 4.5 cm. longis, laminis oblongo-oblanceolatis vel anguste obtuseque obovatis; principalia caulina sessilia,

late oblongo-lanceolata, ciliata, crassiuscula, apice subacuta, 5–7 (–9.5) cm. longa et 1.2–2 (–3.2) cm. lata. Capitula pedunculata pedunculis 1.5–2.5 dm. longis, radiata, pansa ad anthesin 3.5–4 dm. lata et ±12 mm. alta. Involucri bracteae exteriores 8–10, lanceolatae vel lineari-lanceolatae, tergo glabratae, margine saepe diaphana ciliatae, apice acutae cartilagineaeque, 4–7 (rariter –8) mm. longae; interiores late lanceolatae, plerumque 12–14 mm. longae. Flores ligulati circ. 8, flavidi, unicolores, obovati vel late oblanceolati, apice trilobati lobo mediano valde emarginato, circ. 1.5 cm. longi. Paleae superne elongatae et valde caudato-attenuatae. Disci florum stigmata apice caudata. Achaenia suborbicularia, valde obcompressa, dorsaliter convexa, brunneo-atra, alata alis membranaceis planis vel rarissime parce incurvatis 0.2–0.4 mm. latis, apice saepe bidenticulata, faciebus perspicue tuberculata, facie ventrali raro callosa, corpore ipso oblongo-obovato vel late oblongo-oblanceolato 2–3 mm. longa et 1.3–2 mm. lata.

Type specimen: Collected by *Julian Reverchon*, No. 2077 pro parte, in sandy woods, Mineola, Texas, June 12, 1900 (Berl.).

Distribution: Known only from type locality and vicinity, Texas.

Specimens examined: *Reverchon*, Pine Island, May 5, 1903 (Mo.); *idem 2041*, sands, Big Sandy, May 27, 1901 (Mo., 2 sheets); *idem 2077* pro parte (type, Berl.; cotype, Mo.); *idem 2077* pro parte, sands, Mineola, June 10, 1900 (Mo.).

The stems of the plants examined are uniformly leafy from bottom to top as in *Coreopsis pubescens* and the leaves resemble the glabrous, undivided ones occasionally found in that species. The elongate peduncles, however, also the pronounced differentiation between exterior and interior involucral bracts, are more as in *C. lanceolata*, although not typical for that species.

45. **Coreopsis pubescens** Ell. Sketch Bot. S. Carol. & Georgia 2: 441. 1824. *C. auriculata* Schkuhr, Handb. ed. 2, *pl. 260*. 1808 (non L.). *C. auriculata* var. γ Torr. & Gray, Fl. N. Amer. 2: 343. 1843. *C. auriculata* var. δ Torr. & Gray, op. cit. 344 (excl. syn. quod *C. pubescens* var. *robusta* est).

Plus minusve pubescens vel hirsuta....*C. pubescens* sensu stricto.
Caulis ramique glabri vel glabrati.....var. β *robusta*.

Herba perennis, erecta, simplex vel paulum ramosa ramis suberectis, plus minusve pubescens vel hirsuta, 6–12 dm. alta, caule usque ad summam folioso. Folia opposita, polymorpha, saepius 5–10 cm. longa, inferiora longe (2–5 cm.) tenuiterque petiolata altera

saepe sessilia, laminis nunc integris ovalibus vel oblongo-ovatis vel elliptico-lanceolatis nunc (plus minusve irregulariter) 3–5-partitis foliolis lateralibus plerumque multo minoribus ac oblonge linearilanceolatis. Capitula tenuiter pedunculata pedunculis 1–2 dm. longis, radiata, pansa ad anthesin 3–5 cm. lata et 8–11 mm. alta. Involucri bracteae subaequales plus minusve glabratae, exteriores 8–10, lineari-lanceolatae, plurivittatae, 7–10 mm. longae; interiores ovatae. Flores ligulati circ. 8, flavi, ligula cuneati vel oblongo-cuneati, apice 3-lobati lobo mediano rursus 2–4-lobulato, 1–2.3 cm. longi. Paleae inferne latiores superne elongato-filiformes, demum 6–8 mm. longae, achaenia multum superantes. Florum tubulosorum stylorum rami apicem versus abrupte angustati et lineari-appendiculati. Achaenia obcompressa, suborbiculata, circ. 2.8–3 mm. longa, corpore ipso nigra, alis (±0.5 mm. latis) planis integris saepe purpurea, faciebus glabra vel papillata, ventraliter apice basique saepius gibbo cartilagineo munita, apice vero squamellis fimbriatis plerumque 2-dentata.

Type specimen: None cited, but habitat given as "western districts of Georgia."

Distribution: Virginia, Illinois, and Oklahoma southward to Florida, Alabama, and Louisiana. Sometimes escaped or adventive elsewhere.

Specimens examined (it may well be that these determinations, most of which were made many years ago, include a few specimens which are properly referable to the var. *robusta*): *Samuel M. Bain 95* p.p., fields, Henderson, Tennessee, May, 1893 (Gray); *H. C. Beardslee & C. A. Kofoid*, alt. 900 meters, Great Smoky Mountains, Swain County, North Carolina, August, 1891 (Field; Gray); *Beyrich*, grassy banks of rivers, Georgia (Berl., 2 sheets); *F. Boynton*, Highlands, North Carolina, 1889 (Gray; Mo.); *Buckley*, Alabama (Gray); *B. F. Bush 172A*, uncommon, in dry ground, McDonald County, Missouri, September 1, 1893 (Gray); *idem 6041*, woods, Webb City, Missouri, July 23, 1910 (N.Y.); *idem 6137*, woods, Monteer, Missouri, August 8, 1910 (Gray); *idem 6531*, eodem loco, October 22, 1911 (Mo.); *idem 7872*, open woods, eodem loco, October 8, 1916 (Gray); *Carpenter*, Louisiana (Gray); *A. W. Chapman*, mountains of Georgia (Field); *A. H. Curtiss 17*, rich woods, Jackson County, Florida, June 18, 1886 (Gray; foliis sed non achaenis *C. auriculatae* adpropinquans); *H. Eggert*, dry woods, Jefferson County, Missouri, July 8, 1879 (Gray); *George Engelmann*, Mountain Creek bottom, Missouri, 1833 (Mo.); *idem*, St. Louis, Missouri, August, 1863 (Berl.); *Henry*

A. Gleason 2749, dry, upland woods, Makanda, Illinois, July 22, 1902 (Gray); *idem 2750*, cleared uplands along railroad, eodem loco et tempore (Gray); *P. Graebner*, cult. in Hort. Berol. ex sem. ex Amer. Boreali missis, August 5, 1910 (Berl.); *J. M. Greenman 3771*, Sheffield Mountain, near Arcadia, Missouri, July 22, 1915 (Mo.); *H. E. Hasse*, Desoto, Missouri, July, 1887 (Field); *Elihu Hall*, central Illinois (Gray); *W. Hoffman*, Corn Creek, vicinity of Rolla, Missouri, July 15, 1871 (Berl., 2 sheets); *Hort. Berol.*, 1806–1812 (Berl.); *Hort. Lips.* ex Amer. septentr. (Berl.); *Hort. Paris*, 1816 (Berl.); *H. W. Houghton 3864*, common, open woods, near Shawneetown, Oklahoma, May 28, 1916 (Gray); *H. D. House 4023*, below 900 meters alt., sandy soil along Avery's Creek, Pisgah Forest, North Carolina, September, 1908 (Gray); *John H. Kellogg*, Allenton, Missouri, August 12 and 13, 1884 (Mo.); *idem*, St. Louis, Missouri, July 15, 1903 (Mo.); *George W. Letterman*, Allenton, Missouri (Mo.); *Kenneth K. Mackenzie 328*, common in woods, Pleasant Grove, Missouri, July 21, 1897 (Field); *Michaux*, North America (Berl.); *E. J. Palmer 2317* and *2317A*, open woods, Forest Mill, Missouri, June 23, 1909 (Gray); *idem 2513*, barrens, Joplin, Missouri, July 20, 1909 (Gray); *idem 29347*, rich, moist soil, vicinity of Beaver, Arkansas, October 24, 1925 (Gray); *Thomas C. Porter*, Hawk's Nest on New River, 9 miles above Kanawha Falls, West Virginia, July 21, 1880 (Field; N.Y.); *Ns. Riehl 65*, very moist ground, St. Louis, Missouri, July, 1838 (Berl.); *F. Rugel*, in rocky, wet places of the mountains at Broad River, North Carolina, June–July, 1841 (Berl.; N.Y.); *idem*, in open places and along roads, between Quincy and Aspalaga, Florida, May, 1843 (Mo.); *Albert Ruth 655*, along railroad, Valley Head, Alabama, July, 1898 (Mo.); *idem 665*, Lulu Falls, Lookout Mountain, Georgia, July, 1898 (N.Y.); *E. M. Shepard*, Greene County, Missouri, July, 1880 (Gray); *Earl E. Sherff 989*, southeast of Pacific, Missouri, August 7, 1910 (Gray); *idem 5005*, cult., Harvard Univ. Bot. Gard., August 12, 1929 (Berl.; Field); *C. W. Short 42*, Lexington, Kentucky, 1831 (Gray); *John K. Small*, alt. 750–1,500 meters, on slopes of Thomas Bald, boundary of North Carolina and Georgia, August 19, 1893 (Field); *idem*, alt. 1,560 meters, summit of Thomas Bald, August 19, 1893 (Field); *idem*, base of Currahu Mountain, Toccoa, Georgia, July, 1896 (N.Y.); *Huron H. Smith 1089*, along railway tracks, Des Arc, Missouri (Field); *idem 2456*, Blue Ridge Mountains, Fannin County, Georgia, July 22, 1909 (Field); *idem 2582*, eodem loco, August 7, 1909 (Field); *John Donnell Smith*, alt. 1,410 meters, north face of cliffs, Wildcat Ridge,

west flank of Whitesides Mountain, 6 miles northeast from Highlands, North Carolina, August 21, 1882 (Gray); *idem*, alt. 1,440 meters, face of cliffs, eodem loco et tempore (Field; Mo.); *idem*, alluvial banks of river at Cumberland Falls, Whitler County, Kentucky, August 23, 1883 (Field); *idem*, thickets, alluvial banks of Soquee River, Habersham County, Georgia, September 13–15, 1883 (Field; Gray); *idem*, edge of woods, banks of Oconee River, above Milledgeville, Georgia, August 16, 1884 (Field; Gray); *idem*, gullies in high, wooded hills west of Cahawba River, Perry County, Alabama, September 2, 1885 (Field; Gray); *G. W. Stevens 2387*, shady, grassy thicket in woods near Ottawa, Oklahoma, August 27, 1913 (Gray); *Roland Thaxter*, Cullowhee, North Carolina, June–July, 1887 (Gray); *R. E. Woodson, Jr. 655*, Crawford County, Missouri, July 10, 1926 (Mo.).

Passes into the var. *robusta*.

Coreopsis pubescens var. *β* **robusta** A. Gray ex Eames, Rhodora 18: 239. 1916. *C. testudinea* Shuttl. in herb.

E specie caule ramisque glabris vel glabratis differt.

Type specimen: Collected by *Asa Gray* and *John Carey*, North Branch of New River, North Carolina, July, 1841 (Gray).

Distribution: Virginia and North Carolina westward to Kentucky.

Specimens examined: *Biltmore Herb. 307c*, slopes of Cedar Cliff Mountain, Buncombe County, North Carolina, August 2, 1897 (Gray; Mo.); *John Carey*, North Carolina (N.Y.); *idem & Asa Gray*, North Branch of New River, etc. (type, Gray; cotype, N.Y.); *iidem*, Virginia, July, 1841 (Gray); *E. H. Eames 8825*, growing about 1 meter tall, waste grounds, Bridgeport, Connecticut, July 21, 1914 (Gray); *M. L. Fernald & Bayard Long 19265*, fallow field northeast of East Brewster Station, Brewster, Massachusetts, July 20, 1919 (Gray); *P. A. Rydberg 9445*, alt. 1,650–1,800 meters, Craggy Mountains, Buncombe County, North Carolina, July 21, 1925 (N.Y.; Pom.); *John Donnell Smith*, growing 4 ft. high, upland meadow, Richland Gap, Heywood County, North Carolina, August 14, 1882 (Gray; Mo.); *idem*, alluvial soil and sandy bank of river, Cumberland Falls, Whitley County, Kentucky, August 23, 1883 (Gray; Mo.).

Originally regarded by Asa Gray (Amer. Journ. Sci. 42: 45. 1841) as a "larger form of *Coreopsis auriculata*, with nearly all the leaves undivided." At times very distinct, again scarcely distinguishable from the species proper.

46. **Coreopsis heterolepis** Sherff, Bot. Gaz. 89: 365. 1930.

Herba perennis, glabra, caule angulata, ramosa, dense foliosa, 3–6 dm. alta. Folia membranacea plus minusve dimorpha: basalia dense congregata, petiolata petiolis planis angustissime alatis usque ad 6 cm. longis, petiolo adjecto 8–12 cm. longa, indivisa spathulata vel oblonga apice obtusa, alia pinnata foliolis nunc linearibus nunc oblanceolatis nunc oblongis nunc rhomboideo-subovatis ac etiam 1–1.7 cm. latis, lateralibus saepius 1–2 jugis ac multo minoribus; caulina numerosissima, petiolata petiolis anguste marginatis marginis basi rarius setis pluriloculatis sparsim positis obsita circ. 1–2.5 cm. longis petiolo adjecto circ. 6–10 cm. longa, plerumque pinnata, foliolis anguste linearibus, 2–8 cm. longis et 0.3–2.5 mm. latis, apice subacutis, lateralibus 1–2 jugis. Capitula tenuissime pedunculata pedunculis 1–2 dm. longis, radiata, pansa ad anthesin 3–4 cm. lata et 5–7 mm. alta. Involucri glabri vel subglabri bracteae exteriores angustissime lineares, saepius patentes, apice acutae, 5–11 mm. longae; interiores ovato-lanceolatae nunc breviores nunc longiores. Flores ligulati circ. 8, omnino flavi, ligula cuneato-obovati, apice obtuse 4-dentati, circ. 1.5–1.8 cm. longi. Paleae superne capillares, circ. 4–5 mm. longae. Disci florum stigmata caudato-elongata. Achaenia minima plano-convexa, corpore nigro oblongo vel oblongo-ovato ipso tantum circ. 1.3–1.7 mm. longa et circ. 1–1.5 mm. lata, faciebus levia vel papillato-rugosa, marginibus anguste alata alis rubris circ. 0.2–0.4 mm. latis, apice minutissime 2-squamellata squamellis fimbriolatis.

Type specimen: Collected by *Ernest Jesse Palmer*, No. 6962A, on dry, sandy bluffs, Heber Springs, Cleburne County, Arkansas, October 30, 1914 (Mo., 4 sheets).

Distribution: Known only from type locality.

Specimens examined: *Palmer 6962A* (4 type sheets, Mo.).

47. **Coreopsis grandiflora** Hogg ex Sweet, Brit. Fl. Gard. 2: *pl. 175*. 1826; Nutt. Trans. Amer. Phil. Soc. 2, 7: 358. 1841. *C. Boykiniana* Nutt. loc. cit. *C. heterophylla* Nutt. loc. cit. (nec alior.). *C. grandiflora* var. *subintegrifolia* Torr. & Gray, Fl. N. Amer. 2: 345. 1843.

Caules foliaque pubescentia vel piloso-hispida.....var. γ *pilosa*.

Caules et foliorum facies plerumque glabrata.

Foliorum segmenta omnia anguste linearia vel quidem filiformia. var. δ *Harveyana*.

Foliorum simplicium lamina vel divisorum segmenta latiora.

Folia caulis basim versus adgregata, pedunculis crassis elongatis (saepe 2–3 dm. longis).....var. *β longipes.*

Folia subaequaliter distributa, pedunculis tenuioribus saepius 0.8–1.5 dm. longis.....*C. grandiflora* sensu stricto.

Herba perennis vel raro annua, erecta vel adscendens, plerumque non pubescens nisi petiolis ciliatis, 3–6 dm. alta, saepe ramosa, plerumque foliosa. Folia opposita, plus minusve petiolata petiolis saepius 0.5–4 cm. longis, inferiora simplicia vel irregulariter partita lamina (vel segmento terminali) spathulata vel lanceolata, petiolo adjecto saepius 5–10 cm. longa; alia plerumque 3–5-partita (raro simplicia) segmentis interdum rursus 3–5-partitis segmentis ultimis linearibus vel lanceolato-linearibus, plerumque 1.2–5 mm. latis. Capitula saepius solitaria, moderate pedunculata pedunculis tenuibus saepius 1–1.5 dm. longis, radiata, pansa ad anthesin 3–6 cm. lata et 8–12 mm. alta. Involucri bracteae exteriores 7–10, saepe dupliciter dispositae, lanceolato-subulatae, infra saepe subdilatatae, margine ciliatae et plus minusve albidae, 5–9 (raro –18) mm. longae; interiores ovatae, nunc paulo longiores nunc paulo breviores. Flores ligulati plerumque 8, flavi, ligula cuneato-obovati, apice 3-lobati lobo mediano majore rursus 2-partito, 1.3–2.5 cm. longi. Paleae lineares, infra latiores supra attenuatae filiformesque, demum circ. 6–7 mm. longae. Flores tubulosi summa aurantiaci, stylorum ramis apice perspicue cuspidati. Achaenia obcompressa et dorso convexa, circumambitu (alis inclusis) orbiculata, circ. 2.5 mm. longa, corpore nigra, faciebus glabra vel minute papillata, ventraliter apice basique saepe verruca callosa magna ornata, marginibus alata alis planis vel vix incurvatis quam corpore dimidio angustioribus, apice minute biaristata aristis squamellatis fimbriolatisque vel demum calva.

Type specimen: Sent by a *Mr. Hogg* from New York to England as a new species and represented by Robert Sweet's type plate (loc. cit.).

Distribution: Missouri and Kansas southward to Florida, Louisiana, and New Mexico.

Specimens examined: *H. C. Benke 3279*, Pensacola, Florida, March 9, 1922 (Field); *George D. Butler 16*, prairies, 1.5 miles north of Limestone Gap, Oklahoma, June 13, 1877 (Field); *F. S. & Esther S. Earle 73*, 4 miles northwest of Auburn, Alabama, July 13, 1899 (Mo.); *Esem E. Hall*, Texas, 1877 (Gray); *W. H. Haller 982*, low ground, Wilson County, Kansas, 1895 (Gray); ex *Hort. Berol.* (Gray); *H. W. Houghton 3567*, common on hillsides, vicinity of Tishomingo, Oklahoma, April 15, 1916 (Gray); *Dr. Leavenworth*, Louisiana

(Gray); *Le Conte*, North America (Gray); *George W. Letterman*, Gratiot, Missouri, May 30, 1897 (Field); *idem*, along Frisco Railroad near St. Louis, Missouri, August, 1899 (Mo.); *Lindheimer*, Houston, Texas, April, 1842 (Gray); *Kenneth K. Mackenzie 100*, frequent, introduced along railroads, Kansas City, Missouri, June 5, 1898 (Field); *Dr. Pitcher*, Arkansas (Gray); *J. Reverchon*, sandy loams, woods, Dallas, Texas, May, 1874 (Mo.); *idem*, Dallas, May, 1876 (Gray); *idem 513*, sandy forests, Dallas, May, 1883 (Mo.); *idem 1478*, rich sands, Dallas, May (Berl.; Field); *Albert Ruth 482*, in rich woods near Arlington, Texas, May 24, 1920 (Field, 2 sheets); *J. H. Schuette 76*, cult., Green Bay, Wisconsin, August 28, 1900 (Field); *John K. Small*, alt. 300–330 meters, on Little Stone Mountain, De Kalb County, Georgia, July 7, 1893 (Field, 2 sheets; Gray); *H. E. Wheeler 62*, near Hazen, Grand Prairie, Arkansas, May 22, 1924 (Field); *Charles Wright*, Texas (Gray).

Coreopsis grandiflora var. β **longipes** (Hook.) Torr. & Gray, Fl. N. Amer. 2: 345. 1843. *C. longipes* Hook. Bot. Mag. *pl. 3586*. 1837.

Folia caulis basim versus dense vel moderate adgregata, plerumque simplicia vel pinnata; pedunculis crassioribus elongatis saepe 2–3 dm. longis.

Type specimen: Collected by *Thomas Drummond* in Texas and illustrated by Hooker with type plate (loc. cit.).

Distribution: Texas.

Specimens examined: *Elihu Hall*, Texas, 1877 (Field); *idem 342*, wet prairie, Houston, April 18, 1872 (Field); *Earl E. Sherff 278*, cult., St. Louis, Missouri, July 7, 1910 (Field).

Coreopsis grandiflora var. γ **pilosa** Sherff, Bot. Gaz. 89: 368. 1930.

A specie caulibus foliisque pubescentibus saepe etiam longe patenteque piloso-hispidis differt.

Type specimen: Collected by *Stewardson Brown*, *Nathaniel L. Britton*, and *Peter Bisset*, No. 2011, cultivated at Agricultural Station, Island of Bermuda, May 22–June 6, 1914 (N.Y.).

Distribution: Known in a native state only from northern Georgia.

Specimens examined: *Brown, Britton, & Bisset 2011* (type, N.Y.); *John H. Kellogg*, cult., Missouri Bot. Gard., May 23, 1911 (Mo.); *John K. Small*, alt. 210–300 meters, between Alcovy River and No

Business Creek, Oconee and Gwinnett Counties, Georgia, July 14, 1893 (Field, 2 sheets; U.S.); *idem*, alt. 225 meters, on banks of Yellow River near McGuire's Mill, Gwinnett County, July 11, 1893 (Mo.); *idem*, alt. 255 meters, on banks of Yellow River, near Yellow River (Store), Gwinnett County, July 20, 1893 (Field).

The two cultivated specimens examined have a very unique aspect because of their marked hispidity. In spontaneous material the hairs are shorter and less spreading.

Coreopsis grandiflora var. δ **Harveyana** (A. Gray) Sherff, Bot. Gaz. 94: 593. 1933. *C. Harveyana* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 292. 1884.

Foliorum segmenta anguste linearia vel quidem filiformia; achaeniis paulo minoribus, circ. 2 mm. longis.

Type specimen: Collected by *Francis LeRoy Harvey*, No. 22, on cliffs near Fort Smith, Arkansas, June (Gray).

Distribution: Missouri and Arkansas, perhaps also Kansas and Oklahoma.

Specimens examined: *Anon.*, Arkansas National Forest, Arkansas, 1909 (U.S.); *B. F. Bush 158*, Sheffield, Missouri, June 12, 1894 (Berl.); *Frederick V. Coville 127 Ark.*, Mountain Park near Little Rock, Arkansas, July 17, 1887 (U.S.); *H. Eggert*, Williamsonville, Missouri, June 11, 1893 (Field); *F. L. Harvey 22* (type, Gray, cum *C. tinctoria* Nutt. pro parte parva commixta); *E. J. Palmer 8120*, wet, open hillsides, Malvern, Arkansas, June 23, 1915 (Mo.); *H. S. Reynolds*, Judsonia, Arkansas, May 31, 1877 (Field); *Huron H. Smith 1150*, railway tracks, Des Arc, Iron County, Missouri, June 8, 1908 (Field).

The type sheet of *C. Harveyana* Gray bears 3 specimens. The first at the left is *C. tinctoria* Nutt., having the oblong, wingless achenes, the bicolored ligules, the subtruncate style branch tips, the linear-oblong paleae, etc. of that species. The other two specimens are very distinct, having orbiculate, winged achenes, caudate-conical tips to the style branches, upwardly elongate-attenuate paleae, etc. Gray clearly was misled by the admixture of the small *C. tinctoria* specimen, for in his Synoptical Flora he separated *C. Harveyana* partly on the basis of the "rays sometimes brown-purple at base." Had the rays of *C. Harveyana* really possessed the tendency toward a bicolored state, a separation of the type as a new species would have been justified. Since the rays were really yellow, however, the type had nothing left to separate it from *C. grandiflora* proper except the

narrower leaf divisions and the slightly smaller achenes. These differences Gray himself elsewhere (e.g. *C. Drummondii* Torr. & Gray, et var. *Wrightii* ipsi, Syn. Fl. N. Amer. 1, pt. 2: 291. 1884) considered as connoting a variety. (A supposedly duplicate sheet of the Harvey material at St. Louis [Mo.] bears all *C. tinctoria* Nutt.!)

48. **Coreopsis auriculata** L. Sp. Pl. 908. 1753. Chrysanthemum hirsutum Virginian. auriculato Dulcamaraefolio octopetalon. Chrysanth. etc. Plukenet Alm. *pl. 83, f. 5.* 1691; Pluk. Phytogr. *pl. 242, f. 4.* 1769. Chrysanthemum trifoliatum minus Virgin. foliis obtusioribus, hirsutis Morison Hist. Univ. Oxon. 3, sect. 6, *pl. 3, f. 45 (46).* 1715. *Cymbaecarpa auriculata* (L.) Hort. Reg. Matrit. ex Elench. Pl. Hort. Bot. Destremx 1805: 19. 1806. *Leachia trifoliata* Cass. Dict. Sci. Nat. 25: 389. 1822 (ex synon. *C. auriculata* L.). *Chrysomelea auriculata* (L.) Tausch Hort. Canal. 1823. *Coreopsis auriculata* var. *diversifolia* Ell. Sketch Bot. S. Car. Ga. 2: 437. 1824. *Chysomelea auriculata* (L.) Tausch ex DC. Prodr. 5: 571. 1836 (sphalm). *Coreopsis auriculata* var. *a* Ell. ex DC. loc. cit. *Coreopsis auriculata* var. *glabrata* DC. loc. cit. *Anacis auriculata* (L.) Schrank, Denkschr. Akad. Muench. Math. Nat. 5: 7. 1817. *Coreopsis diversifolia* DC. loc. cit. (nec alior.). *Coreopsis auriculata* var. *β* Torr. & Gray, Fl. N. Amer. 2: 343. 1843. *Coreopsis oculata* Hort. in Handlist Hardy Rock Pl. Harvard Univ. Bot. Gard. 10. 1927 (sphalm).

Herba perennis, erecta vel adscendens, simplex vel ramosa, pubescens vel hirsuta vel supra interdum glabrata, inferne foliosa, basi stolonifera. Folia opposita, petiolata petiolis nunc tenuibus nunc latis saepe elongatis itaque laminas plurimum excedentibus, petiolo adjecto plerumque 4–12 cm. longa; lamina membranacea, ovato-orbiculata vel elliptico-ovata, apice obtusa vel subacuta, lateribus integra vel 1–2-lobata lobis parvis basalibus. Capitula solitaria ramos elongatos (saepius 1–2.5 dm. longos) nudos terminantia, radiata, pansa ad anthesin 3.5–5 cm. lata et circ. 9–10 mm. alta. Involucri bracteae subaequales, exteriores circ. 8, pallidae, ovato-oblongae vel lanceolato-oblongae, apice rotundatae vel subacutae, lateribus saepe tenuissime albido-marginatis glabratae vel hispido-ciliatae; interiores ovatae. Flores ligulati circ. 8, flavi, ligula obovati vel late cuneati, apice 3-lobati lobo mediano emarginato, 1.5–2.3 cm. longi. Paleae anguste lineares, superne attenuatae, demum 6–9 mm. longae. Florum tubulosorum ramorum styli terminis caudato-cuspidati. Achaenia oblanceolata vel obovata, obcompressa, incurvata, nigra, glabra vel minute papillata, marginibus anguste alata alis demum cartilagineis involutisque, 2.2–2.9

mm. longa, apice primo minute bisquamellata demum plerumque calva.

Type specimen: Linnaeus' first citation of literature is that of "Gron. virg. 105." This refers to a plant collected by John Clayton in Virginia and perhaps still extant in London (Brit.). Linnaeus cited also the two illustrations by Plukenet (loc. cit.) and the one by Morison (loc. cit.); all three are clear and agree unmistakably with each other.

Distribution: Virginia and Kentucky southward to northern Florida, Mississippi, and Louisiana. Cited also for Illinois by Robinson and Fernald (Gray's New Man. 838. 1908).

Specimens examined: *Biltmore Herb. 176*, rich woods, Biltmore, North Carolina, May 15, 1896 (Field; Gray); *idem 176b*, eodem loco, May 20, 1897 (Field; Gray); ex herb. *G. W. Bischoff* (Gray); *S. B. Buckley*, Alabama, June, 1841 (Mo.); *idem*, Virginia (Gray); *William M. Canby 53*, Stone Mountain, Georgia, May 3, 1899 (Gray); *idem 54*, Chattahoochie, Georgia, May 2, 1899 (Gray); *A. W. Chapman*, mountains of Georgia (Field); *Miss M. A. Coe*, Atlanta, Georgia, May 6, 1903 (Gray); *A. H. Curtiss*, Bedford County, Virginia, June 1, 1871 (Gray); *idem*, eodem loco, May 31, 1872 (Field); *idem 1485*, rich woods, Jackson County, Florida, June (Berl.; Field); *F. S. Earle & C. F. Baker*, Auburn, Alabama, April 4, 1897 (Field); *J. Hale*, Alexandria, Louisiana (Gray); *T. G. Harbison*, Highlands, North Carolina, May, 1902 (Gray); *R. A. Harper 74*, Talladega County, Alabama, April 16, 1906 (Gray); ex herb. *Dr. A. C. Hexamer & Dr. F. W. Maier*, rich woods, Soluda River, Lexington District, South Carolina, June 14, 1855 (Gray); ex *Hort. Berol.* (Gray); *M. E. Hyams*, Statesville, North Carolina, July, 1880 (Pom.); *C. Mohr*, open woods throughout the mountains, Lawrence County, Alabama, May, 1880 (Field); ex herb. *eiusdem*, Winston County, Alabama, May 1, 1881 (Field); *P. H. Rolfs 392*, Pensacola, Florida, April 11, 1894 (Field); *Albert Ruth*, open woods, near Knoxville, Tennessee, May, 1895 (Gray; Pom.); *idem 67*, rich woods, Knox County, Tennessee, June 15, 1900 (Gray); *idem 652*, copses, Knoxville, May, 1898 (Mo.); *C. W. Short*, Lexington, Kentucky, 1835 (Gray); *J. K. Small & A. A. Heller*, near R. and D. Railroad, between Fall Creek and Danville, Virginia, June 3, 1891 (Field); ex *Dr. Steetz*, ex Lexington, Kentucky (Berl.); *J. T. Stewart*, northern Mississippi, 1863 (Field); *K. A. Taylor*, dry, sandy pine woods, Columbia, South Carolina, May, 1890 (Field); *G. R. Vasey*, North Carolina, 1878 (Field); *E. H. Wharf*, North Carolina (Gray).

49. **Coreopsis congregata** Blake, Journ. Wash. Acad. Sci. 19: 275. 1929.

Herba annua, gracilis, erecta, subsimplex, sparsim pubescens, 1–3.5 dm. alta, caule sulcato-striato, sparsim piloso praecipue superne pilis plerumque adscendentibus, internodiis 2–5 cm. longis. Folia opposita sessilia vel petiolata petiolis pilosissimis usque ad 1 cm. longis, omnino circ. 2–4 cm. longa, pinnatifida vel inferiora bipinnatifida, circumambitu triangulata; segmentis ultimis membranaceis, oblongis vel ovatis vel lanceolato-ovatis, acutis vel obtusis, calloso-mucronulatis, utrinque pilosis, marginibus ciliatis, jugo infimo paene distincto. Capitula pauca (1–7), nunc solitaria nunc corymbosa, tenuissime pedunculata pedunculis sparsim pilosis erectis nudis vel minute 1–2-bracteatis 2–5 cm. longis, radiata, pansa ad anthesin 1–1.5 cm. lata et 0.5–0.7 cm. alta. Involucri pilosi bracteae exteriores circ. 8, tenues, anguste spathulatae vel lineares, obtuse calloso-apiculatae, 2.5–3.5 mm. longae et circ. 0.7 mm. latae, 3-nervatae nervo mediano multo magis perspicuo; interiores elliptico-oblongae, apice obtuso ciliolatae, aureae, 5–7-nervatae, 4.5–4.8 mm. longae et circ. 1.8 mm. latae. Flores ligulati 8, aurei, steriles, ligula elliptico-oblongi, apice subintegri, tantum circ. 5-nervatae, circ. 6–7.5 mm. longi et 2.5–2.8 mm. lati, tubo glandulis stipitatis instructo. Paleae lineares, acutae vel obtusae, glabrae, flavae, circ. 4-vittatae, circ. 3.5 mm. longae. Flores tubulosi 12–20, corollis aureis tubo glandulis stipitatis instructis, stylorum ramis termino anguste caudato-appendiculatis. Achaenia exteriora obcompressa, obovata vel cuneato-rotundata, brunneo-atra, glabra, tergo levia vel superne plus minusve muricata, ventris mediane unicostati ac crustaceo-mamillati basi callosa, marginibus incrassatis subbrunneis circ. 0.3 mm. latis longitudinaliter rugulosa infra sinuata supra in lobos paucos rotundatos divisa, apice parce depressa ac exaristata, 2–2.3 mm. longa et 1.3–1.5 mm. lata; interiora angustiora.

Type specimen: Collected by *Ynes Mexia*, No. 445, common at altitude of 1,200 meters, growing in masses, in damp places in openings in oak and pine forests, trail from El Batel to Pica de Aguila, Sierra Madre, State of Sinaloa, Mexico, November 14, 1925 (Gray).

Distribution: Known only from type locality in State of Sinaloa, Mexico.

Specimens examined: *Mexia 445* (type, Gray; cotype, Mo.).

50. **Coreopsis nuecensis** Heller, Bot. Expl. S. Texas 106. 1895. *Coreopsis coronata* Hook. Bot. Mag. *pl. 3460*. 1836 (nec alior.).

Herba annua, sparsim hirsuta vel fere glabra, 2–6 dm. alta, caulibus erectis sed debilibus, basim versus ramosis, superne nudis. Folia opposita jugis saepe remotis, summa subsessilia, alia petiolata petiolis latis angustissimisve hispido-ciliatis (pilis pluriarticulatis) usque ad 5 (quidem ad 12) cm. longis, petiolo adjecto 4–10 (–20) cm. longa, lamina nunc late ovalia vel oblongo-spathulata integra, nunc pinnatim secta segmentis usque ad 5, ultimo multo maximo, lateralibus saepius alternis raro lobatis imis saepe petiolulatis. Capitula ramos nudos saepe 2–3 dm. longos (pedunculos) terminantia, radiata, pansa ad anthesin circ. 3.5–4.8 cm. lata et ± 1 cm. alta. Involucri bracteae exteriores circ. 8, oblongo-lanceolatae vel anguste deltoideo-ovatae vel subulatae, tergo glabratae, apice angusto saepius rotundatae, lateribus saepe diaphanae, marginibus ciliatae setis piluloculatis, 5–8 mm. longae, quam interiores ovatae tergo glabrae vel albido-setosae apice subacutae paulo breviores. Flores ligulati circ. 8, ligula cuneato-ovati, basim versus maculis magnis atro-sanguineis vel brunneo-rubris ornati aliter flavi, apice 3-lobati lobo mediano multo majore plerumque in 2 lobulos hos saepe emarginatos rursus diviso, 1.5–2 cm. longi. Paleae lineares, supra demum angustissimae ac coloratae, 3–6 mm. longae. Flores tubulosi nunc flavidi nunc superne purpurascentes, stylorum ramis crasso-truncatis minute ac abrupte mucronatis. Achaenia obcompressa, circumambitu alis inclusis obovato-orbiculata circ. 4 mm. longa et circ. 4 mm. lata, dorso (convexo brunneo-nigro) spinulis saepe capitatis dense ventre (concavo utrinque plerumque perspicue calloso) sparsim munita, alata alis membranaceis brunneis irregulariter incisis vel lobatis circ. 1 mm. latis, apice 2 squamellis vel spinulis usque ad 0.4 mm. longis munita.

Type specimen: Raised from seed collected by *Thomas Drummond* in Texas, about 1835.

Distribution: Southeastern Texas.

Specimens examined: *Berlandier 1802*, from Bejar (Bexar) to Austin, Texas, April, 1828 (Gray). *A. H. Curtiss 6362*, waste ground, escaped from cultivation, St. Augustine, Florida, April 13–May 18, 1898 (Gray; Mo.); *Thomas Drummond 199*, Texas (Gray); *Elihu Hall*, cult. e sem. texanis, Athens, Illinois, 1864 (U.S.); *Hort. Cantabr.*, cult. anno 1848 e sem. texanis a Lindheimero lectis (Gray, 2 sheets); *idem*, cult., September, 1856 (Mo.); *Marcus E. Jones 29511*, Kingsville, Texas, March 29, 1932 (Pom.); *idem 29512*, Encino, Texas, March 28, 1932 (Pom.); *F. Lindheimer*, prairies west of the Brazos River, Texas, April (Mo.); *idem 363*, Guadeloupe

bottoms at Victoria, Texas, February, 1845 (Mo.); *C. Mohr*, cult. e sem. texanis, Mobile, Alabama, May 10, 1887 (U.S.); *H. Ness 2078*, moist forest lands, Brazos County, Texas, April, 1900 (Mo., 2 sheets); *E. J. Palmer 9144*, sandy, open ground, Inez, Texas, March 11, 1916 (Mo.); *Earl E. Sherff 5017*, cult. in Harvard Univ. Bot. Gard. (Hort. Cantabr.), August 12, 1929 (Field; Kew); *B. C. Tharp 5635*, Woodboro, Texas, March 17, 1929 (U.S.); *Tracy 8925* p.p., Victoria, Texas, April 27, 1905 (Mo.).

Heller's name *C. nuecensis* goes back by direct synonymy to the name *C. coronata* Hook., which it supersedes because of the homonym *C. coronata* L. Heller's cited specimen (*A. A. Heller 1548*, Corpus Christi, Texas, April 11, 1894), however, was very different from *C. coronata* Hook. and was, indeed, at the time an undescribed species. It was later named *C. similis* Boynt. (qu. vide).

51. **Coreopsis cordylocarpa** A. Gray, Proc. Amer. Acad. 22: 428. 1887.

Perennis, fruticosa, multicaulis, foliosa, 1.5–1.8 meters alta, brevissime adpresso-hispida, caulibus subtetragonis. Folia tenuiter petiolata petiolis 1–3.5 cm. longis, petiolo adjecto plerumque 0.7–2 dm. longa, submembranacea, pinnatim 3–5-partita foliolis simplicibus vel rursus 2–3-fidis, segmentis ultimis linearibus vel anguste oblongo-lanceolatis saepius 3–11 mm. latis, margine indurato-crassiusculis et apicem acutum subacuminatumve versus acriter (interdum inciso-) dentatis. Capitula subcymosa pedunculata pedunculis tenuibus folia paulo vel multo superantia, radiata, pansa ad anthesin 3–4 cm. lata et circ. 1 cm. alta. Involucri plus minusve hispidi bracteae subulatae, exteriores lineares 4–6 mm. longae, quam interiores lanceolatae saepe paulo longiores. Flores ligulati circ. 10, lutei, ligula oblongi, apice integri vel denticulati, 1.5–2.2 cm. longi. Paleae oblongo-lineares, glabrae, apice acutae, demum 5–7 mm. longae. Florum tubulosorum stylorum rami apice conico-angustata. Achaenia obcompresso-clavata, glabra, exalata, brunneo-nigra, obscure longitudinaliterque striata, circ. 8–12 mm. longa et ± 1.5 mm. lata, apice contracto disco parvo calvo terminata.

Type specimen: Collected by *Edward Palmer*, No. 172, at Río Blanco, State of Jalisco, Mexico, July, 1886 (U.S.).

Distribution: Known only from State of Jalisco, Mexico.

Specimens examined: *C. R. Barnes & W. J. G. Land 155*, alt. 1,560 meters, bank of stream, Sierra de San Esteban, State of Jalisco, September 28, 1908 (Field, 2 sheets); *Palmer 172* (type, U.S.;

cotypes, Gray; N.Y.); *C. G. Pringle 2367*, river banks, near Guadalajara, State of Jalisco, October 7, 1889 (Field; Gray; N.Y.); *idem 9885*, alt. 1,500 meters, banks of Río Blanco, near Guadalajara, July 31, 1902 (Berl.; Field; Gray; N.Y.); *idem 11506*, eodem loco, October 20, 1903 (Field; Gray).

52. **Coreopsis elgonensis** Sherff, Bot. Gaz. 80: 374. 1925.

Planta erecta, perennis, ramosa, 8–10 dm. alta; ramis angulatis, glabris, infra ligneis, internodiis numerosis et saepe tantum 3–10 mm. longis. Folia opposita, numerosa, sessilia, tantum circ. 1–1.8 cm. longa, ternatim divisa, foliolis membranaceis, margine ciliatis, faciebus atro-punctatis et interdum sparsissime hispidis, cuneatis, ternatim lobatis vel integris, segmentis ultimis acerrime apiculatis, plerumque 2–3 mm. latis. Capitula pauca in corymbis disposita pedunculis 2–9 cm. longis, radiata, pansa ad anthesin 2.5–3.5 cm. lata et 8–11 mm. alta. Involucri bracteae exteriores 6–11, lineares, supra latiores, apice acutae, plerumque glabratae, 5–9 mm. longae; interiores lanceolatae, hispidae, paulo breviores. Flores ligulati 8–12, flavi, ligula anguste elliptico-oblanceolati, apice rotundati sed minute plus minusve denticulati, 8–12 mm. longi et 3–4.5 mm. lati. Paleae oblongo-lanceolatae, brunneae, pluristriatae, apice saepe longo-attenuatae, circ. 6–7.5 mm. longae. Disci florum stigmata caudato-attenuata. Achaenia late lineari-oblonga, plana, omnino atra, glabra, exaristata, 3.5–4.8 mm. longa et 1.1–1.3 mm. lata, marginibus non vere membranaceis.

Type specimen: Collected by *R. A. Dummer*, No. 3304, locally frequent, at altitude of 3,900 meters, in thicket at edge of cliff, west side of crater, Mount Elgon, Uganda, British East Africa, January, 1918 (Kew).

Distribution: Known only from type locality.

Specimens examined: *Dummer 3304* (type, Kew).

Strongly suggestive, in general habit, of such South American species as *Coreopsis polyactis* and *C. senaria*. The many small, sessile, cuneate, ternate or biternate leaves appear at first glance to be in whorls rather than in pairs. Correlated with the leaf abundance is the shortness of the internodes. Thus, for example, one branch of the type is seen to have 28 internodes in a length of 2.5 dm., giving an average length of only about 9 mm.

53. **Coreopsis Chippii** M. B. Moss, Kew Bull. 196. 1929.

Suffrutex, 1 m. altus, caulibus (glabratis) et ramulis (puberulis) subteretibus, internodiis 5–12 mm. longis. Folia opposita, tenuiter

petiolata petiolis circ. 4–6 mm. longis, petiolo adjecto circ. 1.5–2 cm. longa, 1–2-pinnatisecta, segmentis glabris vel glabriusculis, acriter apiculatis, crassiusculis, tantum circ. 0.2–0.4 mm. latis. Capitula subcorymbosa, tenuiter pedicellata pedicellis valde puberulis et circ. 1–2.5 cm. longis, radiata, pansa ad anthesin ± 2.3 cm. lata et 5–6.5 mm. alta, demum subglobosa et circ. 1 cm. diametro. Involucri hispidi bracteae exteriores 10–20, lineares, obtusae vel etiam subtruncatae, 4–5 mm. longae et circ. 0.5 mm. latae, saepe patentes; interiores late lanceolatae paulo longiores. Flores ligulati (probabiliter circ. 8), flavi, ligula anguste obovati, apice 3-denticulati, circ. 1 cm. longi. Paleae oblongae, obtusae, glabrae, nitidae, superne atriores, 4.5–5.5 mm. longae. Disci florum stigmata truncata, minute appendiculata. Achaenia valde obcompressa, dorso convexa, anguste obovato-oblonga, nigra, glaberrima, apice truncato exaristata, ad latera crassiusculo-marginata sed non vere alata, circ. 4 mm. longa et 1–1.4 mm. lata.

Type specimen: Collected by *Thomas Ford Chipp*, No. 66, growing in scrub on mountain top, also in forest in ravines, at altitude of 3,125 meters, top of Mount Kinetti (Kineti), Imatong Mountains, southern Sudan, February 11, 1929 (Kew).

Distribution: Known only from type locality in southern Sudan. ("The Imatong Mountains, the highest point of which is Mt. Kineti, 10,414 feet, are situated between 4° and 4° 30′ N. and 32° 20′ and 33° E., just north of the boundary between the Anglo-Sudan and Uganda"; T. F. Chipp, Kew Bull. 177. 1929.)

Specimens examined: *Chipp 66* (type, Kew).

54. **Coreopsis scopulorum** Sherff, Bot. Gaz. 88: 302. 1929.

Frutex +2 dm. altus, glaber, ramosus, ramis foliosissimis, internodiis saepe tantum 3–5 mm. longis. Folia opposita, petiolata petiolis 6–10 mm. longis, petiolo adjecto tantum 1.2–2 cm. longa, plus minusve biternatisecta, segmentis ultimis linearibus, subcarnosis, margine saepe revolutis, apice mucronatis, vix 1 mm. latis. Capitula tenuiter pedunculata pedunculis 3–5 cm. longis ac saepe ad ramorum terminos 3–5-adgregatis, radiata (radiis in typo deficientibus sed ovariis circ. 8 sterilibus repraesentatis), demum circ. 8 mm. alta et 7–10 mm. lata. Involucri bracteae exteriores circ. 8, anguste lineares, patenti-reflexae, apice rotundatae vel abrupte cuspidatae, circ. 3 mm. longae, interioribus lanceolatis atque apicem versus reflexis subaequalibus. Paleae perspicuae, late oblongae, apice rotundato-obtusae, achaeniorum corpora moderate superantes.

Disci florum stigmata apice perspicue caudata. Achaenia linearia, obcompressa, exalata, faciebus marginibusque erecto-setosa, atra, singula facie circ. 8-striata, corpore 5–6 mm. longa et 0.7–1 mm. lata, apice erecto-setosa ac perspicue biaristata aristis tenuibus erecto-hispidis circ. 2.5 mm. longis.

Type specimen: Collected by *Edmund Heller*, on cliffs at altitude of 2,130 meters, on summit of Mount Garguez, British East Africa, August 26, 1911 (U.S.).

Distribution: Known only from type locality.

Specimens examined: *Heller*, on cliffs at alt. 2,130 meters, summit of Mount Garguez, British East Africa, August 26, 1911 (type, U.S.).

Apparently nearest *Coreopsis elgonensis* (from which it differs in its longer and petiolate leaves, its shorter external involucral bracts, its aristate achenes, etc.) and *C. Chippii* (from which it differs in its much broader leaf segments, etc.). All three species offer a strong resemblance to certain low, shrubby South American species of *Coreopsis*.

55. **Coreopsis Jacksonii** S. Moore, Journ. Linn. Soc. 35: 347. 1902. Plate 1. *Bidens spathulata* Sherff, Bot. Gaz. 76: 149, *pl. 13*. 1923. *B. Jacksonii* (S. Moore) Sherff, Bot. Gaz. 81: 45. 1926.

Folia plus minusve glabra ..... *C. Jacksonii.*

Folia pro parte maxima dense hispida ..... var. *β arthrochaeta.*

Herba procumbens vel adscendens, plus minusve glabra, forsitan annua, caule subsimplici nonnullis nodis radicante, 3.5–5 dm. longo. Folia non manifeste petiolata, 4–8 cm. longa et 1.5–2.5 cm. lata, valde membranacea, spathulato-oblanceolata, apice subobtusa, inferne sensim angustata, integra vel remotissime minimeque denticulata, ciliata, in sicco plus minusve stramineo-viridia. Capitula perpauca (1–3), pedunculata pedunculis pubescentibus usque ad 6 cm. longis, radiata, pansa ad anthesin circ. 3.5–4.5 cm. lata et 7–9 mm. alta. Involucri bracteae exteriores circ. 6, membranaceae, oblongae vel oblanceolatae, ciliatae, apice orbiculatae, ad anthesin circ. 8–10 mm. longae et 2–3 mm. latae; interiores oblongo-ovatae, apice subacutae, ad anthesin circ. 3.5–4.5 mm. longae. Flores ligulati circ. 6, lutei, ligula elliptico-oblanceolati, apice dentati, 1.5–1.8 cm. longi et 4.5–6.5 mm. lati. Florum tubulosorum stigmata termino anguste elongata. Achaenia subatra vel brunneo-atra, crasso-clavata, plus minusve tumida ac quadrangulata, non manifeste striata, circ. 3.2–3.7 mm. longa et 1.1–1.7 mm. crassa, glabrata, exalata, exaristata sed apice saepe reliquo basali floris hermaphroditi coronata itaque false rostrata.

Type specimen: Collected by *Frederick J. Jackson*, Kikuyu region, British East Africa, 1889 (Brit.).

Distribution: Kikuyu region and northward to Mount Kenya (Kenia), British East Africa.

Specimens examined: *Frederick J. Jackson*, Kikuyu region, 1889 (type, Brit.); *Edgar A. Mearns* 1291, alt. about 3,630 meters, in "giant heath" zone, western slopes of Mount Kenya, British East Africa, September 21–27, 1909 (type of *Bidens spathulata* Sherff, U.S.); *idem 1722*, alt. about 3,000 meters, bamboo zone, western slopes of Mount Kenya, September 28–October 7, 1909 (U.S.).

A species strikingly different from all other species of *Coreopsis* and easily distinguished from other African species by its thin, spatulate leaves. Its habit of rooting at many of the nodes, evidently in response to aqueous conditions of the habitat, is almost as distinctive, being common in only a few species of these two genera.

My examination of the type specimen of *Coreopsis Jacksonii* S. Moore (Brit.) showed that it was merely a tiny, dwarfed specimen (cf. Moore, loc. cit., "unfortunately a mere scrap") of the species described and illustrated by me under the name of *Bidens spathulata*. (The type of *Bidens spathulata*, it will be noted, was collected upon Mount Kenya, British East Africa, while the type of *Coreopsis Jacksonii* was collected in the small Kikuyu area immediately to the southwest.) Because, however, of its very diminutive stature (being only a few centimeters high), it lacked the spatulate type of leaves that so strongly characterizes larger plants. The leaves were more rotund in outline. For these reasons, Moore's description of *Coreopsis Jacksonii* had been, of necessity, so misleading that only a personal study of his type plant could impart an understanding of its true specific status. As to its generic status, its complete lack of mature achenes, as also in the case of the type of *Bidens spathulata*, made it necessary to rely upon general habit, which is somewhat more that of *Bidens* than of *Coreopsis*. The recent finding (1) of the var. *arthrochaeta* of this species and (2) of *Mearns 1722* of the species proper makes it possible, however, to refer the species definitely to *Coreopsis*.

Coreopsis Jacksonii var. *β* **arthrochaeta** Sherff, Bot. Gaz. 88: 302. 1929.

A specie foliis pro parte maxima dense hispidis, setis albidis elongatis sensim attenuatis multiloculatis differt.

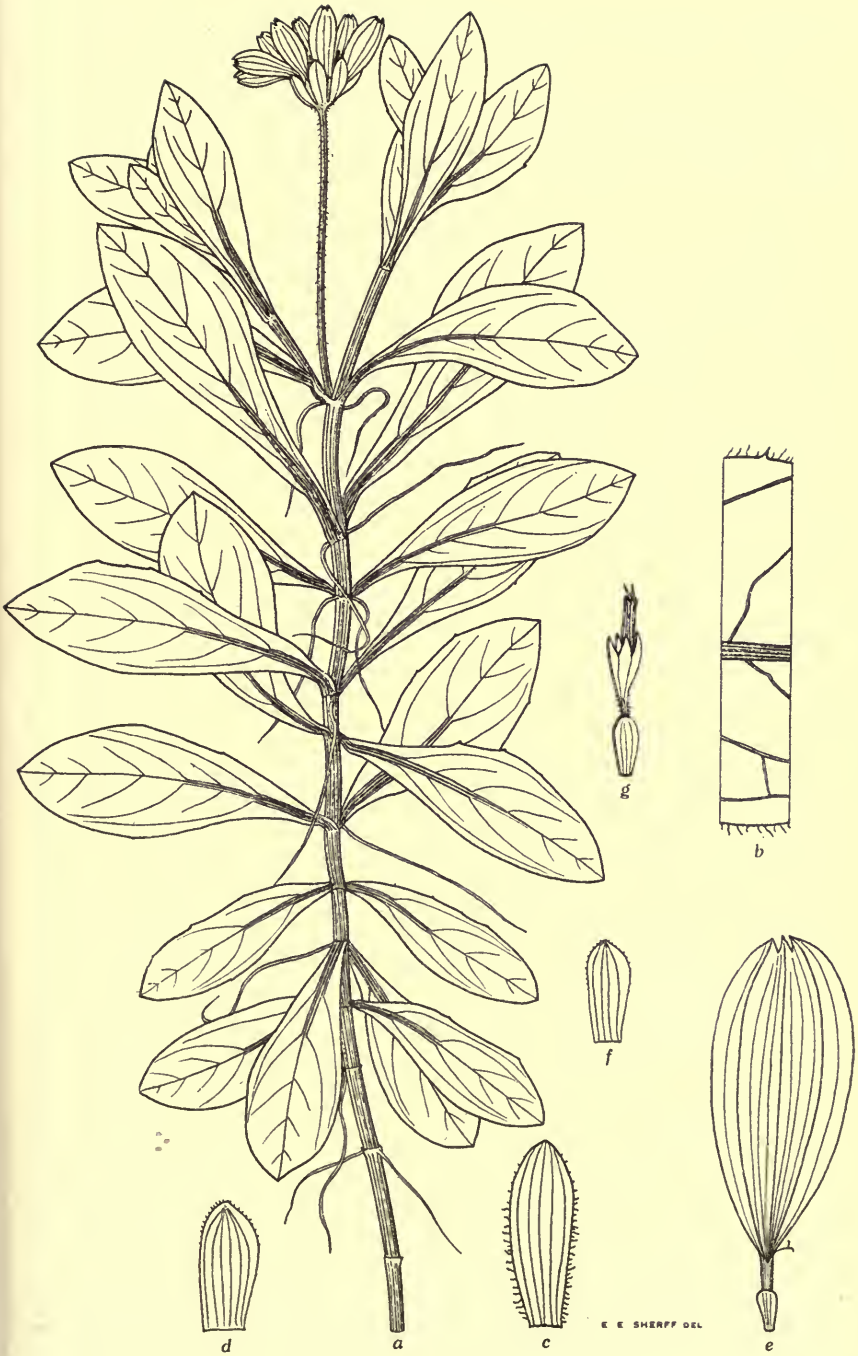

FIG. 1. *Coreopsis Jacksonii* (S. L. Moore) Sherff.

Type specimen: Collected by *R. L. Piemeisel* and *Leonard W. Kephart*, No. 166, at altitude of 3,300 meters, vicinity of Camp Gusisu, Aberdares Mountains, British East Africa, July 29, 1927 (U.S.).

Distribution: Known only from type locality.

Specimens examined: *Piemeisel & Kephart 166* (type, U.S.).

The type material of the var. *arthrochaeta* consisted of at least six small, entire plants and these offer a strikingly unique appearance because of their densely hispid leaves. Since endemism is pronounced among the plants of the Kikuyu region, and since elsewhere even where endemism is relatively unimportant (in the United States) *Coreopsis* displays many forms that are accepted as varieties, it appears worth while to distinguish the *Piemeisel & Kephart* plants as connoting a group of varietal rank.

Explanation of *Fig. 1.—Coreopsis Jacksonii* S. L. Moore: *a*, flowering specimen, ×0.66; *b*, portion of leaf enlarged to show ciliation, ×2.65; *c*, exterior involucral bract, ×2.65; *d*, interior involucral bract, ×2.65; *e*, ligulate floret, ×2.65; *f*, palea, ×2.65; *g*, disc floret, ×2.65; all from *Mearns 1291*, type of *Bidens spathulata* Sherff, Herb. U. S.

56. **Coreopsis Negriana** Sherff, Bot. Gaz. 90: 397. 1930.

Herba annua, erecta, ±5 dm. alta, caule gracili, glabro vel ad summam subhispido, viridi-stramineo. Folia opposita petiolata petiolis usque ad 12 mm. longis saepe tenuissimis petiolo adjecto ±5 cm. longa, 1–2-pinnatisecta, segmentis principalibus linearioblongis, membranaceis, supra infraque glabratis, marginibus ciliatis, acriter serratis dentibus interdum in setas elongatas desinentibus. Capitula graciliter pedunculata pedunculis moderate hispidis usque ad 14 cm. longis, radiata, pansa ad anthesin 2–2.5 cm. lata et circ. 6–7 mm. alta. Involucri hispidi bracteae subaequales exteriores circ. 8, lineari-spathulatae, acriter indurato-apiculatae, 3–4 mm. longae; interiores oblongo-ovatae, apicaliter saepe acutae. Flores ligulati circ. 8, flavi, ligula lineari-elliptici, apice obtuso obscure denticulati, circ. 1 cm. longi et circ. 2–3 mm. lati. Paleae nitido-hyalinae, lineari-oblongae vel lineari-lanceolatae, demum conduplicatae ac achaenium amplectentes, maturae circ. 6 mm. longae. Disci florum stigmata subito capilliformi-caudata. Achaenia lineari-oblonga, valde obcompressa, glabra, corpore nigro estriato vel obscurissime multistriato tantum 3–4 mm. longa et circ. 1 mm. lata, marginibus anguste alata alis brunneis glabrisque, apice exaristata ac glabra.

Type specimen: Collected by *Giovanni Negri*, No. 915 bis, at altitude of 1,500 meters, Arussi Galla, June 30, 1909 (Flor.).

Distribution: Known only from type locality in Arussi Galla, Gallaland.

Specimens examined: *Negri 915 bis* (type, Flor.).

A species close to *C. pachyloma* O. & H., from which it differs, however, in its smaller capitula, also its smaller achenes which are obcompressed, winged, and glabrous. The general habit is deceivingly like that of *Bidens setigera* (*Coreopsis setigera* Schz. Bip.), some of the foliar teeth even having the setiform extensions so notable in that species. But *B. setigera's* achenes are distinctly striate, upwardly setose upon the faces and edges, entirely exalate, and (in the species proper) at the apex conspicuously slender-aristate.

57. **Coreopsis camporum** Hutch. Kew Bull. 381. 1921.

Herba perennis, erecta, caule 1–1.25 m. alto, basim versus dense foliato internodiis brevibus, glabro, simplici vel superne corymboso-ramoso. Folia opposita, petiolata petiolis anguste marginatis circ. 1–2.5 cm. longis, petiolo adjecto 0.5–1.5 dm. longa, simpliciter vel rarius bipinnata, sicca laete viridia, segmentis linearibus vel lineari-lanceolatis, acutis, revolutis, unaquaque facierum glabris, margine spinuloso-setulosis et saepe sparsim dentatis (dentibus e basibus triangularibus et longe setigeris), usque ad 9.5 cm. longis et 7 mm. latis. Capitula pauca vel numerosa, subcorymbosa, breviter tenuiterque pedunculata pedunculis superne puberulis, radiata, pansa ad anthesin 2–3 cm. lata et 6–9 mm. alta. Involucri bracteae exteriores circ. 12, patulae, lineares, acutae, tergo glabratae sed marginibus setulosae, 0.8–1.5 cm. longae; interiores adscendentes, oblongo-lanceolatae, obtuse acuminatae, circ. 6 mm. longae et 2 mm. latae, crebre resinoso-striatae. Flores ligulati circ. 10, aurantiaci, fertiles, ligula oblongo-elliptici, apice breviter bilobati, circ. 1.2–1.5 cm. longi et circ. 4 mm. lati, circ. 9-nervii. Paleae oblongo-oblanceolatae, minute mucronatae, circ. 5.5 mm. longae et circ. 1.5 mm. latae. Achaenia immatura lineari-oblonga, complanata, omnino brunnea, alata, ciliato-pubescentia, corpore 4–5 mm. longa, biaristata aristis rigidis circ. 2.5 mm. longis.

Type specimen: Collected by *H. V. Lely*, No. 383, at altitude of 1,380 meters on plains between Hepham and Ropp, northern Nigeria, July 5, 1921 (Kew).

Distribution: Northern Nigeria.

Specimens examined: *Lely 383* (type, Kew); *idem 449*, alt. 1,380 meters, Ropp, July 19, 1921 (Kew); *J. Dent Young 153*, alt. 900–1,350 meters, waste land, Vom, Bauchi Plateau, 1922 (Kew).

58. **Coreopsis Ellenbeckii** O. Hoffm. Bot. Jahrb. 38: 205. 1906.

Herba perennis, glaberrima. Folia (caulium juvenilium) petiolata petiolis alato-marginatis basi connatis 5–10 mm. longis, petiolo adjecto 3–5 cm. longa, bipinnatipartita, rhachi late linearia ac alata segmentis linearibus acutis apicaliter callosis 1–2 mm. latis. Capitula (tantum unicum terminantem ramum juvenilem vidi) tenuiter pedunculata pedunculo glabro fere 3.5 cm. longo, radiata, pansa ad anthesin (bracteis patentibus inclusis) circ. 4.5 cm. lata et circ. 11 mm. alta. Involucri bracteae exteriores circ. 5, perspicue foliaceae, trifidae, glaberrimae, apicaliter callosae, 1.7–2.4 cm. longae, lobo terminali multo majore ±1.5 mm. lato et usque ad 1.5 cm. longo; interiores oblongae membranaceae brunneae margine angusto luteolo cinctae circ. 7–8 mm. longae. Flores ligulati 8, flavi, ligula elliptico-oblongi, multistriati, ±1.8 cm. longi et ±4 mm. lati, apice acriter 3-dentati dente mediano acriter bidenticulato. Disci florum stigmata terminaliter caudata. Achaenia matura non visa; ovariis obcompressis, margine hyalino cinctis faciebus glaberrimis sed marginibus dense erecto-ciliatis ciliis superioribus elongato-sericeis, biaristatis aristis corolla brevioribus rigide erecto-hispidis.

Type specimen: Collected by *Dr. Ellenbeck* (Exped. *Baron von Erlanger*), No. 529, at altitude of 2,500 meters in meadows on mountain slopes, on the Gara Mulata, Harar, State of Harar, eastern Abyssinia, March 21, 1900 (Berl.).

Distribution: Known only from type locality at Harar, eastern Abyssinia.

Specimens examined: *Ellenbeck 529* (type, Berl.).

Founded upon the lone type specimen, which consists of four leafy stems 13–20 cm. long, one of them ending in a flowering head. These come from the base of an old stem some 6 mm. thick which had died away. The juvenile or second-growth nature of the parts relied upon for the technical description leave some doubt as to the degree to which the characters recorded are truly representative.

59. **Coreopsis lineariloba** O. Hoffm. Bot. Jahrb. 30: 430. 1901.

Herba perennis, ramosa, ramis glabris, erectis, internodiis saepius 9–13 cm. longis. Folia opposita petiolata petiolis planis ac anguste marginatis usque ad 3 cm. longis, petiolo adjecto usque ad 12 cm.

longa, bipinnatipartita segmentis rhachi subsimilibus saepius 1–1.5 cm. longis et plerumque 1.2–2.5 mm. latis linearibus apice acuto mucronatis glabris etiam eciliatis. Capitula mediocria tenuiter pedicellata pedicellis glabris cymam laxam bracteis linearibus munitam formantia, radiata, pansa ad anthesin circ. 2 cm. lata et 7–9 mm. alta. Involucri bracteae exteriores 10–12, lineares, apice obtusae acutaeve, basi ciliatae ceterum glabrae, 4–6 mm. longae; interiores ovatae, acuminatae, apice tomentellae ceterum glabrae, saepe paulo breviores. Flores ligulati circ. 8–10, flavi, ligula ovati, apice subintegri, circ. 1 cm. longi. Paleae late oblongae, apice subacutae. Disci florum stigmata terminaliter caudato-attenuata. Achaenia matura ignota; ovariis obcompressis glabris vel saepius margine et inter aristas pappi ciliatis, pappi aristis 2 (raro 3) subulatis tubum corollae superantibus antrorsum longe pectinato-ciliatis.

Type specimen: Collected by *W. Goetze*, No. 790, growing 1 meter high on red laterite at altitude of 1,900 meters on an undulating plateau, Liangira, Ubena, southwesternmost German East Africa, March 24, 1899 (Berl.).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Goetze 790* (type, Berl.).

60. **Coreopsis Schimperi** O. Hoffm. Bot. Jahrb. 38: 205. 1906. *Microlecane abyssinica* f. *elongata* Vatke, Linnaea 39: 497. 1875.

Herba perennis, glaberrima, e radice fasciculata radiculis ±1 dm. longis et circ. 2.5 mm. crassis, erecta vel basim versus procumbens et nodis radicans, caule gracili subsimplici 6–9 dm. alto. Folia opposita petiolata petiolis brevibus basaliter dilatatis connatisque tantum circ. 2–7 mm. longis, petiolo adjecto usque ad 5.5 cm. longa, quam internodia multo brevioria, circumambitu late deltoideo-ovata, 2–3-pinnatipartita segmentis linearibus acutis apice callosis margine raro spinuloso-ciliatis circ. 1 (raro 2) mm. latis. Capitula in corymbo amplo laxiusculo foliis reductis bracteato disposita pedicellis gracilibus spinuloso-hispidis vel glabratis apice paululo dilatatis usque ad 4.5 cm. longis, radiata, pansa ad anthesin 2–2.8 cm. lata et tantum circ. 5 mm. alta. Involucri bracteae exteriores circ. 8 (raro usque ad 10), anguste lineares, subherbaceae, glaberrimae, subacriter calloso-apiculatae, 3–3.5 mm. longae et circ. 0.4 mm. latae; interiores late ellipticae, medio membranaceae purpurascentes pilos breves crassos gerentes, margine hyalina glaberrimae, apice

in acumen breve obtusum productae, quam exteriores interdum paulo longiores. Flores ligulati circ. 8, flavi, ligula oblongo-elliptici, apice plerumque 3-lobulati, 1–1.5 cm. longi et 4–7 mm. lati. Paleae hyalinae, nitidae, late lineari-oblongae, apice subobtusae, lineis 3 duplicibus percursae circ. 4–5 mm. longae. Disci florum stigmata minima terminaliter caudato-angustata. Achaenia leviter obcompressa, nitida, crasso-clavata, glaberrima, aegre striata, exalata, exaristata, circ. 2.5 mm. longa et fere 1 mm. lata.

Type specimen: Collected by *Wilhelm Schimper*, No. 1386, in meadows at altitude of 2,460 meters, Gaffat, Abyssinia, October 15, 1863 (Berl., 2 sheets).

Distribution: Abyssinia.

Specimens examined: *Rohlfs & Stecker*, Godofelassi, Abyssinia, January 7, 1881 (Berl.); *Schimper 1386* (2 type sheets, Berl.; type and cotype of *Microlecane abyssinica* f. *elongata* Vatke).

The type material had been incorrectly ranked by Vatke as a forma under *Microlecane abyssinica* (Schz. Bip.) B. & H. f. (*Bidens setigera* [Schz. Bip.] Sherff). As O. Hoffmann (loc. cit.) has shown, the two are very different.

61. **Coreopsis Prestinariaeformis** Vatke, Linnaea 39: 499. 1875. *C. Pristinariaeformis* Vatke ex O. & H. in Oliv. Fl. Trop. Afr. 3: 387. 1877 (sphalm). *C. heterocarpa* Chiov., Ann. Bot. Roma 9: 75. 1911 (pro maxima parte; cf. etiam var. *incisa* infra).

Folia simplicia vel pinnatim 3–5-tripartita. *C. Prestinariaeformis* sensu stricto.

Folia bipinnatisecta..... var. *β incisa*.

Herba annua, undique plus minusve pilis crassis flexuosis obsita, caule simplex vel quidem e basi valde ramosa, 1–6 dm. alta. Folia sessilia vel breviter petiolata, 2.5–7 cm. longa, circumambitu ovato-lanceolata vel deltoideo-cordata, sicca subvalde membranacea, simplicia vel plurimum subincise 3- vel etiam sub 5-partita, segmentis varie ovatis vel rhomboideo-ovatis et margine dentatis vel incisis lateralibus multo minoribus. Capitula saepius numerosa vel numerosissima, tenuiter pedicellata pedicellis ante et per anthesin erectis postea hamato-recurvis et tunc cernua, radiata, pansa ad anthesin circ. 2.8–3.3 cm. lata et circ. 1–1.2 cm. alta. Involucri bracteae aequilongae, exteriores 10–12, patulae, lineares vel lineari-spathulatae, apice obtusae vel acutiusculae, glabrae, circ. 4–6 mm. longae; interiores ovato-lanceolatae vel oblongo-ovatae, rufidulae, in dorso notatae ibique pilis longis crassis flexuosis flavescentibus onustae.

Flores ligulati 6 vel 7, aurei, ligula varie elliptico-obovati oblongo-elliptici vel late spathulato-oblanceolati, apice denticulati, superne in centro vel parum subtus macula aurantiaca rotunda elliptica vel lunulata praediti, 1.5–2.5 cm. longi et usque ad 8 mm. lati. Paleae glaberrimae, supra rufae. Achaenia valde obcompressa apice erecto-setosa in 3 vel 4 seriebus exteriora corpore ±8 mm. longa et ±2 mm. lata, marginibus latissime alata alis apice truncatis et setoso-ciliatis; centralia lineari-oblonga exalata setoso-ciliata corpore ±12 mm. longa et ±2.5–3 mm. lata; omnia cum pappo duobus aristis linearibus vel demum lanceolato-subulatis acutissimis achaenii corpori aequilongis vel quidem tantum 3–4 mm. longis antrorsum hispidis formato.

Type specimen: Collected by *Wilhelm Schimper*, No. 1173, at altitude of 2,460 meters in meadows at Gaffat, Abyssinia, September 25, 1863 (Berl., 2 sheets).

Distribution: Abyssinia.

Specimens examined: *Emilio Chiovenda 970*, Debarek, District of Semien, Province of Amhara, Abyssinia, July 11, 1909 (Flor.); *idem 1148*, Gondar, District of Dembià (Dembea), Province of Amhara, Abyssinia, July 30, 1909 (Flor.); *idem 1869*, vicinity of Gondar, September 8, 1909 (Flor.); *idem 1953* et *1954*, District of Dembià, September 8, 1909 (Flor.); *G. W. Grabham*, Bahadur Gorges, on Lake Tana (L. Tsana), Abyssinia (Kew); *Plowden*, Abyssinia (Kew); *Schimper 1173* (type, Berl., 2 sheets; cotype, Kew).

An important plant in the festal celebrations of some of the Abyssinians (cf. Chiovenda, loc. cit.).

Chiovenda (loc. cit.) cited seven of his own specimens as a basis for his *Coreopsis heterocarpa:* Nos. 1090, 1148, 1869, 1953, 1954, 1955, and 970 (in the order here given). His No. 1090 is my var. *incisa* (infra). The others, unless 1955 (*which alone* I have been unable to find at Florence), are *C. Prestinariaeformis* proper. Chiovenda's description as drawn fits primarily *C. Prestinariaeformis.*

Coreopsis Prestinariaeformis var. β **incisa** Sherff, Bot. Gaz. 90: 387. 1930. *C. heterocarpa* Chiov. Ann. Bot. Roma 9: 75. 1911 (pro minima parte).

A specie foliis acriter et perspicue bipinnatisectis segmentis principalibus oblongo-lanceolatis differt.

Type specimen: Collected by *Dr. Ellenbeck* (Expedition of *Baron von Erlanger*), No. 1436, growing 1 meter high at altitude of 2,600 meters, Djafa, Arussi, Galla, Gallaland, July 21, 1900 (Berl.).

Distribution: Northern Abyssinia southward into Gallaland.

Specimens examined: *Emilio Chiovenda 1090*, very common, Gondar, District of Dembià (Dembea), Province of Amhara, Abyssinia, July 26, 1909 (Flor.); *Ellenbeck 1436* (type, Berl.).

62. **Coreopsis Barteri** O. & H. in Oliver, Fl. Trop. Afr. 3: 390. 1877. *C. badia* Sherff, Bot. Gaz. 76: 90. 1923.

Herba glabra, adscendens, ramosa ramis teretibus striatis, 3–10 dm. alta. Folia opposita vel rarius trina, sessilia vel subsessilia, membranacea, 1.5–5 cm. longa, nunc cuneato-oblanceolata et apicem versus subremote acriterque serrata, nunc irregulariter trilobata lobis lineari-oblongis. Capitula ramos singillatim terminantia, tenuiter pedunculata pedunculis 3–9 cm. longis, radiata, pansa ad anthesin 2–2.6 cm. lata et 7–9 mm. alta. Involucri glabri bracteae subaequales, exteriores 7–10, lineari-oblongae, acriter apiculatae, demum 5–7 mm. longae et 0.6–0.8 mm. latae; interiores oblongo-lanceolatae circ. 2.2–2.6 mm. latae. Flores ligulati circ. 8, lutei, ligula lineari-elliptici, apice obscure denticulati, 7–10 mm. longi et 3–4 mm. lati. Paleae late oblongo-lineares, apice obtusissimae, circ. 7 mm. longae. Disci florum stigmata parce incrassata, hispida, caudata. Achaenia obcompressa, atra, corpore tenuiter vel sublate linearia, 5–9 mm. longa et 0.9–1.5 mm. lata, faciebus venuste adpresseque erecto-pilosa, marginibus (saltem achaenia exteriora) late et perspicue membranaceo-alata alis erecto-ciliatis, apice erecto-hispido biaristata aristis tenuibus erecto-hispidis 2–4 mm. longis.—Involucri bracteae interiores, paleae, achaeniorum alae badiae vel parce purpureo-badiae.

Type specimen: Collected by *Charles Barter*, No. 870, chiefly in cultivated ground, Borgu, Upper Guinea (Kew).

Distribution: Northwestern Africa, from Kamerun west to Togo and northward to Borgu.

Specimens examined: *W. B. Baikie*, on the Niger River, West Tropical Africa (Kew); *Barter*, Borgu, Upper Guinea (type, Kew); *Mission Gironcourt 256*, on mountains of gneiss, Togo, 1908–1909 (type of *Coreopsis badia* Sherff, Berl.); *C. Ledermann 1855*, alt. 1,800 meters, swampy place on shore of stream, Babadju, Kamerun, December 15, 1908 (Berl., 2 sheets).

63. **Coreopsis monticola** (Hook. f.) O. & H. in Oliver, Fl. Trop. Afr. 3: 390. 1877. *Verbesina* (*Prestinaria*) *monticola* Hook. f. Journ. Linn. Soc. 7: 200. 1864.

Caulis demum plerumque glabratus.....*C. monticola.*

Caulis laxe vel subdense pilosus.....var. *β pilosa.*

Herba perennis, erecta, rigida, subsimplex, 3–11 dm. alta, caule vix subtetragono, superne circ. 2.5–3.5 mm. crasso, demum plerumque glabrato. Folia opposita petiolata petiolis planis submarginatis 0.6–2 cm. longis, petiolo adjecto circ. 4–5 cm. longa, circumambitu ovata, subcoriacea, margine et facie inferiore aegre hispida vel mox glabrata, trisecta, foliolis 3–5-sectis, segmentis ovatis vel lanceolatis vel anguste oblongis, infra pallidioribus, dentibus acriter apiculatis. Capitula corymbosa, pedunculata pedunculis tenuibus 2–8 cm. longis, radiata, pansa ad anthesin 4–5.5 cm. lata et 8–10 mm. alta. Involucri glabri bracteae exteriores 8 vel 9, lineares, acriter indurato-apiculatae, 8–9 mm. longae, quam interiores oblongo-ovatae nitidae rubro-brunneae vix longiores. Flores ligulati circ. 8 vel 9, aurantiaci, ligula lineares, circ. 13–15-nervii, apice minute sed acriter denticulati, circ. 1.8–2.2 cm. longi et 4.5–6 mm. lati. Paleae lineari-oblongae, circ. 5-nerviae, apice obtusissimae, circ. 9 mm. longae et 2 mm. latae. Disci florum stigmata lanceolato-caudata. Achaenia oblonga, obcompressa, nigra, exalata vel subanguste alata alis stramineis, facie ventrali marginibusque sursum setosa, corpore 3–5.2 mm. longa et alis inclusis 1.1–2 mm. lata, apice corona setarum erectarum coronata ac biaristata aristis tenuibus stramineis sursum hispidis circ. 2.5–3 mm. longis.

Type specimen: Collected by *Gustav Mann*, No. 1922, at altitude of 1,800–2,100 meters, Kamerun (Cameroon) Mountains, Kamerun, November 6, 1862 (Kew).

Distribution: Kamerun.

Specimens examined: *W. Kalbreyer 125*, alt. 2,100–2,550 meters, open plain, dry places, Kamerun Mountain, Kamerun (Berl.); *Luckhardt 626*, Kamerun, December, 1912 (Berl.); *Mann 1922* (type, Kew; cotypes, Berl.; Gray); *F. Mildbraed 3392*, "half-shrub" growing 7.5–10 dm. high, furrows between lava streams, lower Fuko Plateau, Great Kamerun Mountain, Kamerun, June, 1908 (Berl.); *Mintz 40*, alt. 2,400–2,800 meters, Great Kamerun Mountain, October 29, 1910 (Berl.); *Preuss*, alt. 2,000–2,800 meters, Kamerun, 1891 (Berl.); *idem 689*, Buea, Kamerun, 1891 (Berl., 3 sheets; Gray); *Gust. Simon 3*, on lava fields, eodem loco, December 26, 1909 (Berl.).

Coreopsis monticola var. *β* **pilosa** Hutch. & Dalz. Fl. West Trop. Afr. 2: 143. 1931.

Herba usque ad 3 m. alta, caulibus ramisque laxe vel subdense pilosis pilis multiloculatis, foliis membranaceis, petiolo adjecto 6–10 cm. longis, superne hispidis; involucri bracteis exterioribus oblongo-linearibus vel lineari-lanceolatis 6–14 mm. longis et 1.5–3 mm. latis; interioribus tergo hispidis.

Type specimen: Collected by *Dr. Dunlap*, No. 204, growing up to 10 feet high in ravine above timber line at altitude of about 2,100 meters, Kamerun Mountain, Kamerun, January 17, 1926 (Kew).

Distribution: Kamerun.

Specimens examined: *Dunlap 204* (type, Kew); *F. W. H. Migeod 211*, grassland, alt. 2,250 meters, Kamerun Mountains, November 17, 1927 (Kew).

64. **Coreopsis oblonga** Sherff, Bot. Gaz. 76: 80, *pl. 7*. 1923. *Fig. 2.*

Herba erecta, verisimiliter perennis ac 6–12 dm. alta; caule obtuse tetragono, atro, apicem versus pubescenti, alibi glabro. Folia petiolata petiolis hispido-ciliatis vel brevibus (usque ad 1.5 cm. longis) latisque vel longioribus (usque ad 3 cm.) et parce angustis, petiolo adjecto 6–7.5 cm. longa, rigida et subcarnosa, pinnata, foliolis acriter dentatis dentibus calloso-apiculatis, subprofunde incisis sinibus angustis vel foliolis lateralibus infimis etiam tripartitis, breviter hispido-ciliatis, setis acribus sparsissime vestitis, terminali oblongo-lanceolato, lateralibus oblongo-ovatis. Capitula pauca, breviter pedunculata pedunculis subrobustis ac hic illic foliolo-bracteatis usque ad 6 cm. longis, radiata, pansa ad anthesin 2.5–3 cm. lata et 9–11 cm. alta. Involucrum setis validis acribusque hispidum; bracteis exterioribus 6–9, late lineari-spathulatis, apicem versus glabratis, apice subobtusis, 8–11 mm. longis, eis capitulorum juniorum discum manifeste superantibus; interioribus oblongo-oblanceolatis vel oblongo-obovatis, apicem versus constricta, exterioribus demum subaequalibus. Flores ligulati ± 7, aurantiaci, ligula elliptico-lanceolati, apice late obtusi et integri denticulative, circ. 15 striis percursi, tubo adjecto 1.5–2.4 cm. longi, tubo circ. 5 mm. longo. Paleae lineari-oblongae. Flores tubulosi limbo aurantiaci, infra pilosi (ad medium etiam longe hirsuti), supra perpaucis pilis interdum conspersi; stylorum ramis terminaliter elongato-attenuatis. Achaenia matura ignota. Ovaria subnigra, oblongo-cuneata, alata, plana, faciebus glabra, corpore 2–3 mm. longa et 0.7–1 mm. lata, apice arrecte setosa et longe biaristata; aristis acribus, supra et ad medium glabris, basim versus setulis arrectis 1–3 sparsim munitis, 2–2.5 mm. longis.

FIG. 2. *Coreopsis oblonga* Sherff.

Type specimen: Collected by *Alex. Carson*, No. 106, Lake Tanganyika, East Equatorial Africa, September, 1893 (Kew).

Distribution: Known only from type locality in East Equatorial Africa.

Specimens examined: *Carson 106* (type, Kew).

A species approaching *Coreopsis pinnatipartita* O. Hoffm., *Bidens Grantii* (Oliv.) Sherff, and *B. Holstii* (O. Hoffm.) Sherff. The hairy, aristate ovaries distinguish it easily from *C. pinnatipartita*, while the definite wings of the ovaries distinguish it from *B. Grantii* and *B. Holstii*.

Explanation of *Fig. 2.—Coreopsis oblonga Sherff: a*, main portion of flowering specimen, ×0.72; *b*, lower leaf from *a*, ×0.72; *c*, exterior involucral bract, ×4.33; *d*, interior involucral bract, ×4.33; *e*, ligulate floret, ×2.16; *f*, palea, ×4.33; *g*, disc floret with achene immature, ×4.33; all from type, Herb. Kew.

65. **Coreopsis pinnatipartita** O. Hoffm. Bot. Jahrb. 30: 432. 1901.

Fruticosa, perennis, erecta, 1–3 m. alta, ramis erectis, tomentellis, junioribus foliatis. Folia opposita petiolata petiolis anguste marginatis usque ad 3 cm. longis, petiolo adjecto 9–16 cm. longa, pinnatipartita, circumambitu ovata, segmentis ovatis vel lanceolatis, acutis vel obtusis, irregulariter pinnatilobis vel plus minusve profunde serratis, coriaceis, supra scaberulis subtus tomentellis. Capitula in corymbum oligocephalum terminalem congesta, breviter subvaldeque pedicellata pedicellis tomentellis, radiata, pansa ad anthesin 5–6.5 cm. lata. Involucri bracteae aequilongae, ovatae, obtusae, dorso tomentosae, mox reflexae, 8–15 mm. longae, exteriores circ. 8–10, plus minusve biseriales. Flores ligulati circ. 10–12, flavi, ligula elliptici vel elliptico-oblanceolati, apice plerumque acriter denticulati, circ. 3 cm. longi et circ. 6–9 mm. lati. Paleae perspicue 3-pluri-lineatae lineis brunneis vel brunneo-purpurascentibus, apice obtusae, achaenia multo superantes. Disci florum stigmata terminaliter attenuato-elongatae. Achaenia lineari-oblonga, valde obcompressa, glaberrima, nigra vel subbrunneo-nigra, faciebus multistriata, alata alis margine exteriore stramineis ac crassiusculis, 5–6.5 mm. longa et 1.5–1.8 mm. lata, apice exaristato calloso-indurata.

Type specimen: Collected by *W. Goetze*, No. 1041, at altitude of 2,300 meters on slopes of Poroto Mountain, southwesternmost German East Africa, June 17, 1899 (Berl., 2 sheets).

Distribution: Nyassaland to German East Africa.

Specimens examined: *J. Buchanan 380*, Nyassaland, 1891 (Berl.); *A. Engler 1266*, growing 1 meter high at alt. 2,000–2,400 meters, in high mountain shrub and eagle-fern formation, "Magamba oberhalb Kwai," West Usambara, German East Africa, October 4, 1902 (Berl.); *Goetze 1041* (2 type sheets, Berl.); *Ad. Stolz 1306*, growing 3 meters high at alt. 1,450 meters, Kyimbila, Nyassaland, May 23, 1912 (Berl., 2 sheets); *A. Whyte*, alt. 1,200–1,800 meters, Mount Zomba, Nyassaland, December, 1896 (Berl.).

66. **Coreopsis Whytei** S. L. Moore, Journ. Linn. Soc. 35: 348. 1902.

Herba verisimiliter perennis elataque, caule erecto subtereti vel obtuse angulato pubescenti mox glabrato, ad nodos tumido. Folia opposita, principalia petiolata petiolis saepius 2–3 cm. longis petiolo adjecto ±8–10 cm. longa, pinnatifida segmentis ovatis acutis dentato-lobulatis; summa sessilia lanceolata dentato-lobulata integrave; omnia supra sparsissime minutissimeque hispida, subtus pubescentia. Capitula pedunculata pedunculis pubescentibus circ. 2–4 cm. longis, sine dubio radiata, post anthesin fere vel vere 3 cm. lata et ±1.3 cm. alta. Involucri 3-seriati bracteae extimae et intermediae anguste obovatae obtusae adpresso-erecte hispidae pilis pluriloculatis ±1.2 cm. longae; intimae oblongae obtusae tenuiores et paulo breviores. Flores ligulati non observati. Paleae oblongo-lanceolatae, obtusissimae, fere 1 cm. longae. Achaenia valde obcompressa, subcuneate lineari-oblonga, angustissime alata, brunneo-nigra, glabra, faciebus striata, apice incrassato exaristata, circ. 6–7 mm. longa et circ. 2 mm. lata.

Type specimen: Collected by *Alexander Whyte*, No. 35, on Mount Milanji (Mount Mlange), southernmost Nyassaland, October, 1891 (Brit.).

Distribution: Known only from type locality in southernmost Nyassaland.

Specimens examined: *Whyte 35* (type, Brit.).

67. **Coreopsis Lupulina** O. Hoffm. Bot. Jahrb. 30: 432. 1901.

Fruticosa, glaberrima, perennis, ramosa, 2–3 m. alta, ramis angulatis terminaliter foliatis. Folia opposita tenuiter petiolata petiolis basaliter connatis usque ad 4 cm. longis, petiolo adjecto 8–12 cm. longa, principalia bipinnatipartita segmentis oblongis serratis vel pinnatifidis apice acutis, superiora simpliciter pinnatipartita.

Capitula saepius in corymbos densos oligocephalos congesta pedicellis brevibus crassisque, radiata, pansa ad anthesin circ. 6 cm. lata et 1.5–1.8 cm. alta. Involucri bracteae demum valde reflexae, exteriores circ. 7–9 crassiusculae oblongo-ovatae apice obtusae circ. 8 mm. longae et 4–6 mm. latae, interiores membranaceae ovatae vel lanceolato-ovatae obtuse acuminatae apice minute fimbriatae circ. 12 mm. longae. Flores ligulati circ. 10, flavi, ligula elliptici, apice circ. 3-denticulati, circ. 2.5 cm. longi et circ. 7–8 mm. lati. Paleae perspicue brunneo-striatae, lineares, obtusae, corollas superantes, exteriores apicem versus demum reflexae. Disci florum stigmata apicaliter elongato-attenuata. Achaenia valde obcompressa, linearioblanceolata, omnino atra, marginaliter alata alis quam corpore paulo vel etiam dimidio angustioribus, glabra, faciebus multistriata 5.5–8 mm. longa et (alis inclusis) 1.7–2.5 mm. lata, apice calloso-marginata et obtuse emarginata.

Type specimen: Collected by *W. Goetze*, No. 1069, at altitude of 2,400 meters on slopes of Beya Mountain, Usafua, southwesternmost German East Africa, June 27, 1899 (Berl., 2 sheets).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Goetze 1069* (2 type sheets, Berl.).

This species and *C. pinnatipartita* are distinguished from the very similar *Bidens Holstii* (O. Hoffm.) Sherff by their winged achenes.

68. **Coreopsis Neumannii** Sherff, Bot. Gaz. 76: 85. 1923.

Herba ±1.5 m. alta, caule maximam partem glabro, sulcato, ramoso, internodiis folia facile superantibus. Folia subsessilia vel petiolata petiolis usque ad 1 cm. longis, petiolo adjecto 2–4 cm. longa, plerumque tripartita (inferiora non visa, pinnata ?) foliolis ovatis vel interdum lanceolatis, dentatis vel lobulatis, pubescentibus, dentibus acerrime apiculatis. Capitula corymbosa, 5–11 in unaquaque corymborum, radiata, pansa ad anthesin 2.2–2.7 cm. lata et circ. 6 mm. alta, pedunculis tenuibus plerumque 1–3 cm. longis. Involucrum inconspicue hispidum, bracteis exterioribus circ. 8, flavido-viridibus, lineari-spathulatis, apice acutis, 3–7 mm. longis, quam interioribus lanceolatis paulo brevioribus. Flores ligulati plerumque 8, flavi, ligula elliptico-oblongi, paucistriati, apice integri vel denticulati, circ. 1.2 cm. longi. Paleae oblongo-lanceolatae, saepius acutae, nitidae, achaeniorum aristis superatae. Disci florum stigmata caudato-elongata. Achaenia plumbeo-nigra, circumambitu lineari-

oblonga vel oblanceolata, valde obcompressa, alata alis coloris similis, glabra, corpore 3–4 mm. longa et (alis inclusis) 1–1.5 mm. lata, biaristata aristis brevissime sursumque setosis, circ. 0.5–1 mm. longis.

Type specimen: Collected by *Oscar Neumann* (Exped. to Sidamo, Utadera, and Lake Abbaja), No. 134, at altitude of 2,800 meters, mountain meadows, Gardulla (incorrectly printed Gandulla at time of my original description in 1923), Gallaland (southern Abyssinia), January 14, 1901 (Berl.).

Distribution: Known only from type locality in Abyssinia.

Specimens examined: *Neumann 134* (type, Berl.).

The single type specimen has its heads in corymbose clusters, and thus simulates in habit *Bidens squarrosa* HBK. of tropical America.

69. **Coreopsis Feruloides** Sherff, Bot. Gaz. 80: 375. 1925.

Herba erecta, ramosa, forsitan annua, circ. 7–10 dm. alta, glabra, viridis vel glaucescens, caule subtetragono. Folia sessilia vel subsessilia, 4–8 cm. longa, bipinnata, costa mediana tenui, segmentis linearibus vel anguste lanceolatis, crassiusculis, minute ciliatis, obtusis vel subacutis, plerumque 2–4 mm. latis. Capitula subnumerosa, corymbosa, radiata, pansa ad anthesin 2.5–3 cm. lata et 5–7 mm. alta. Involucri subglabrati bracteae exteriores circ. 8, lineares, apice subobtusae indurataeque, 3–5 mm. longae, interiores lanceolatae circ. 6–7 mm. longae. Flores ligulati circ. 8, flavi, ligula lineari-oblongi, apice obtuso saepius emarginati et aegre circ. 3-denticulati, ±1.5 cm. longi et circ. 4–5 mm. lati. Paleae lineari-oblongae, longitudinaliter 1–3-nerviae, apice subabrupte acutae, circ. 5.5–7 mm. longae. Disci florum stigmata caudato-attenuata. Achaenia matura minuta, non exserta, atra, valde obcompressa, lineari-oblonga, leviter alata, faciebus subobscure striata, faciebus marginibusque minute erecto-setosa, corpore tantum 3.5–4 mm. longa et (alis inclusis) parce 1 mm. lata, apice biaristata; aristis tenuissimis, stramineis, setulis minutis erectis numerosis instructis, 1–1.6 mm. longis.

Type specimen: Collected by *E. Battiscombe*, No. 945, at altitude of 2,250–2,400 meters, Kinabop Plateau, Western Aberdare Mountains, British East Africa (Kew).

Distribution: Known only from type locality.

Specimens examined: *Battiscombe 945* (type, Kew).

The general habit simulates very closely that of the Mexican *Bidens serrulata* (Poir.) Desf. (*B. grandiflora* Balb.) and *B. Ferulaefolia*

(Jacq.) DC. The leaves suggest the primary lower lateral portion of the more decompound leaves of *Ferula glauca* L. Aside from the habit, the tiny achenes are very distinctive, very few African species of *Coreopsis* having such small ones. The achenial wings are of the same color as the body proper, thus easily escaping notice. The species is somewhat unwelcome, as it serves further to weaken the generic distinctions between *Coreopsis* and *Bidens*.

70. **Coreopsis ochracea** O. Hoffm. Bot. Jahrb. 30: 431. 1901; Sherff, Bot. Gaz. 80: 375 and *pl. 19*. 1925. *C. cosmophylla* Sherff, op. cit. 76: 90 and *pl. 9, ff. h-n*. 1923. *Bidens ochracea* (O. Hoffm.) Sherff, op. cit. 158. *Fig. 3*.

Herba perennis, e radice crassa caules interdum complures emittens, elatos, parce ramosos, glaberrimos, infra obtuse supra acrius quadrangulatos, 0.8–2 m. altos. Folia pallida petiolata petiolis marginatis usque ad 4.5 cm. longis, petiolo adjecto 4–10 vel saepe etiam usque ad 18 cm. longa, pinnatim 3–5-partita, segmentis subcrassis, integerrimis vel iterum 3- (rarius 2- vel 4-) partitis, ultimis linearibus, plerumque 1.5–5 mm. latis, apice acutis et mucronatis, supra glaberrimis vel breviter scabro-pilosis, subtus glabris vel saepe ad venam medianam perspicuam sparsim setosis, margine paulo revolutis et breviter scabro-ciliolatis. Capitula ramos terminantia, longe pedunculata pedunculis ebracteatis vel foliis reductis bracteatis et usque ad 3 dm. longis, radiata, pansa ad anthesin 4–8.5 cm. lata et 1–1.5 cm. alta. Involucri bracteae exteriores 8–10, basi saepe pilosae, margine sparsim spinuloso-ciliatae, ceterum plerumque glabrae, lineari-ellipticae vel late lanceolatae, supra basim paulo constrictae, latiores saepe ad apicem in acumen breve obtusum subito angustatae, 8–13 mm. longae; interiores lanceolatae vel ovato-lanceolatae paulo longiores, glabrae vel apice minute pubescentes, paleas aequantes vel paulo superantes. Flores ligulati plerumque 8, aurantiaci, ligula lineari-elliptici, saepe minute pulverulento-tomentosi, apice denticulati, 2–3.5 cm. longi. Paleae oblongo-lanceolatae, acutae. Disci florum stigmata terminaliter acuto-subcaudata. Achaenia plana, atra, alata, marginibus erecto-setosa, faciebus glabra, corpore 6–7 mm. longa et 2.5–3.5 mm. lata, apice setosa et biaristata aristis tenuibus, calvis vel sparsissime erecto-setosis, circ. 2 mm. longis.

Type specimen: Collected by *W. Goetze*, No. 731, at altitude of about 1,700 meters, in thin bush-growth on red laterite on hilly plateaus, Bweni, Uhehe, German East Africa, March 11, 1899 (Berl.).

FIG. 3. *Coreopsis ochracea* O. Hoffm.

Distribution: Northern Nyassaland northward through German East Africa into British East Africa.

Specimens examined: *E. Battiscombe 83*, alt. 1,050–1,200 meters, Muhoroni, British East Africa (Kew; forma foliis plus minusve atypica); *Goetze 731* (type, Berl.); *Muenzner 159*, Msamvia, Lake Tanganyika District, German East Africa, February 24, 1909 (Berl.; type of *Coreopsis cosmophylla* Sherff); *W. H. Nutt*, alt. about 1,800 meters, between Lake Tanganyika and Lake Rukwa (L. Rikwa, L. Leopold), 1896 (Kew); *Ad. Stolz 764*, growing 2 meters tall at alt. 600 meters, Kyimbila, Langenburg, German East Africa, June 8, 1911 (Berl.); *idem* (similiter) *764*, alt. 600 meters, eodem loco, February 27, 1912 (Del.); *A. Whyte*, northern Nyassaland (Kew).

Hoffmann had not seen ripe fruits of this species ("Reife Früchte fehlen; nach den Fruchtknoten zu erteilen könnten sie geflügelt sein"; Hoffm., loc. cit.). In my own earlier studies it seemed that the specimens of this handsome species of the Nyassa region were of two kinds, differing generically on the basis of the winged character of the achenes. Further specimens have shown, however, that some material is merely more tardy than the rest in displaying achenial wings. As the specimens mature, their achenes become fairly well winged.

Explanation of *Fig. 3.—Coreopsis ochracea* O. Hoffm.: *a*, *b*, flowering branch and portion of stem with foliage, ×0.58; *c*, *d*, exterior involucral bracts, ×2.33; *e*, interior involucral bract, ×2.33; *f*, ligulate floret, ×1.75; *g*, palea, ×2.33; *h*, disc corolla, ×2.33; *i*, immature achene, ×3.5; all from type, Herb. Berl.

71. **Coreopsis leptoglossa** Sherff, Bot. Gaz. 76: 88. 1923.

Herba annua, erecta, gracillima, speciminibus observatis parce ramosis, caule tetragono, glabro, 8–10 dm. alto. Folia petiolata, petiolis latis hispido-ciliatisque usque ad 7 mm. longis vel angustatis glabratisque usque ad 2.5 cm. longis, petiolo adjecto 5–9 cm. longa, glabra, bipinnata, segmentis linearibus, plerumque circ. 1 mm. rarius 1.5–2 mm. latis, apice acutis, margine non ciliatis sed parce revolutis. Capitula tenuiter pedunculata pedunculis 2–10 cm. longis, radiata, pansa ad anthesin 4–5 cm. lata et 6–9 mm. alta. Involucri bracteae basi dense aliter leviter hispidae setis acribus, arcuatis, multi(6–12)-loculatis, exteriores 8–10, lineares, apice acutae, margine maximam partem non ciliatae, 5–7 mm. longae et 0.6–0.9 mm. latae, interioribus lanceolatis plerumque breviores. Flores ligulati circ. 8, lutei, leptoglossati, ligula lineari-elliptici, apice integri vel obscure denticulati, 2–2.5 cm. longi et 4–6 mm. lati.

Paleae ignotae. Disci florum stigmata angustato-caudata. Achaenia matura ignota; ovariis obovatis, valde obcompressis, late alatis, supra ad margines et medium erecto-hispidis, biaristatis; aristis erecto-hispidis, 0.4–0.7 mm. longis.

Type specimen: Collected by *T. Kassner*, No. 2871, on mountain slope, Lofuku River, Belgian Congo, May 25, 1908 (Berl.).

Distribution: Known only from type locality in Belgian Congo.

Specimens examined: *Kassner 2871* (type, Berl.).

Has flowering heads resembling those of *Bidens Steppia* (Steetz) Sherff, especially as to involucre.

72. **Coreopsis multiflora** Sherff, Bull. Jard. Bot. Brux. 13: 292. 1935.

Herba erecta, forsitan perennis, probabiliter ±1 m. alta, caule vel ramis glabratis atque acriter tetragonis. Folia principalia petiolata petiolis marginatis ±1.5 cm. longis, petiolo adjecto ±1.2 dm. longa, pinnatim circ. 7-partita, foliolis lateralibus oppositis (jugis remotis), inferioribus circ. 5 cm. longis; omnibus membranaceis, circumambitu lanceolatis, cum rhachi confluentes, incise lobulatis (lobulis plus minusve dentatis dentibus acutis) utrinque subsparsim setosis (setis tenuibus) marginibus ciliatis. Capitula pauca ad ramos, pedunculata pedunculis subrobustis inferne glabratis superne setis albidis crispis patentibus hispidis 2–6 cm. longis, radiata, ad anthesin cernua et pansa 5–6 cm. lata et ±1.3 cm. alta. Involucrum basi dense hispidum setis albis crispis acribus pluriloculatis, post anthesin circ. 2–2.3 cm. latum, bracteis subaequalibus; exterioribus linearibus, acutis, crassiusculis, extus glabratis vel sparsim hispidis, intus inferne glabris superne densissime hispidis, 8–11 mm. longis; interioribus ovato-oblongis, extus subsparsim hispidis. Flores ligulati 8–10, aurantiaci, ligula lineares vel lineari-oblanceolati, apice minutissime 2–3-denticulati, circ. 2.5 cm. longi et 4–5 mm. lati. Flores tubulosi numerosi (±125), corollis extrinsecus glabris circ. 5 mm. longis, stylorum ramis longe tenuiterque appendiculatis. Paleae oblongae, apicem ciliatum obtusumque versus atriores, ad anthesin saepius aristas aequantes. Achaenia non visa. Ovaria plana, ovata, alata, infra medium obsolete supra medium manifeste ciliata setis saepe erectis, faciebus glabrata, corpore circ. 3 mm. longa et circ. 1.5 mm. lata, apice biaristata aristis tenuibus antrorsum hispidulis 1–1.5 mm. longis.

Type specimen: Collected by *Dom Benoit Thoreau*, No. 2. 11, Plateau of Bianos, Kansenia, Katanga, Belgian Congo, June, 1927 (Bruss.).

Distribution: Katanga, Belgian Congo.

Specimens examined: *Thoreau 2. 11* (type, Bruss.).

73. **Coreopsis bella** Hutch. Kew Bull. 364. 1907.

Herba erecta, verisimiliter perennis, suffruticosa, ±1 m. alta, ramis parce pubescentibus. Folia petiolata petiolis ±2–3 cm. longis, petiolo adjecto 7–15 cm. longa, tenere coriacea, circumambitu triangulata vel ovato-triangulata, pinnatipartita, supra breviter subtus longe pubescentia segmentis ovato-lanceolatis acutis plus minusve profunde serratis vel irregulariter pinnatilobis. Capitula tenuiter pedunculata pedunculis pubescentibus ±2–6 cm. longis, radiata, pansa ad anthesin circ. 5.5–6.5 cm. lata et circ. 1.4–1.7 cm. alta. Involucri bracteae obtusae, circ. 1.3 cm. longae et circ. 4 mm. latae, exteriores oblongae, pilosae; interiores extrinsecus pubescentes. Flores ligulati circ. 12, flavi, ligula oblongo-elliptici, circ. 3 cm. longi, apice subacuti vel obscure dentati, tubo brevi extrinsecus pilosi. Paleae oblongae, glabrae, apice obtusae, apicem versus leviter constrictae, circ. 1 cm. longae et circ. 1.5 mm. latae. Achaenia immatura plana, pilosa, corpore circ. 1 cm. longa, apice biaristata aristis 1.5 cm. longis.

Type specimen: Raised at Kew in 1907 from seeds collected in British East Africa by *R. Diespecker* (Kew).

Distribution: British East Africa.

Specimens examined: Cult. at Kew from seeds collected by *Diespecker* (type, Kew).

Close in general appearance to some African species of *Bidens*. Mature achenes are much to be desired.

74. **Coreopsis Curtisii** Sherff, Bot. Gaz. 96: 146. 1934. *C. Curtissii* Sherff, Bull. Jard. Bot. Brux. 13: 289. 1935 (sphalm).

Herba erecta, verisimiliter perennis, gracilis, forsitan circ. 0.5 m. alta, subsimplex, caule angulato glaberrimo plus minusve purpureo-striato. Folia opposita, tenuiter petiolata petiolis glaberrimis basi connatis usque ad 2 cm. longis, petiolo adjecto usque ad 8 cm. longa, pinnata vel bipinnatisecta, laminae circumambitu triangulato-ovata, segmentis primariis circ. 3 vel 5 pallidis membranaceis lanceolatis acriter dentatis secundum venas marginesque nunc sparsissime nunc subconferte albido-setulosis. Capitula pauca, ±3-adgregata et ad rami finem corymbose disposita pedunculis erectis tenuibus glaberrimis 4–8 cm. longis, radiata, pansa ad anthesin circ. 3–3.5 cm. lata et circ. 11–13 mm. alta. Involucri pallidi bracteae supra reflexae,

exteriores circ. 8 vel 9, lineari-oblongae, glabrae vel basi extrema hispidae, apice acutae, ±4 mm. longae, interioribus ovato-oblongis apice glanduloso-pubescentibus moderate breviores. Flores ligulati circ. 8, aurantiaci, ligula anguste oblongi, apice integri vel subdenticulati, ±1.5 cm. longi. Paleae lineari-oblongae, apicem versus valde aurantiacae, apice ipso subobtusae. Flores tubulosi extrinsecus glabrae vel secundum corollae superne valde aurantiacae dentes pubescentes et ad tubi apicem sparsim pilosi; stylorum ramis pulcherrime aurantiacis et elongato-appendiculatis. Achaenia matura non visa. Ovaria oblanceolata, plana, nitido-brunnea, longitudinaliter pluristriata, plus minusve alata, marginibus et faciebus saltem supra erecte setosa, corpore ±4 mm. longa, apice valde erecto-setosa et biaristata aristis glaberrimis ±1.5 mm. longis.

Type specimen: Collected by *Mrs. Richard C. Curtis* from material cultivated in 1930 from seeds obtained in Angola, Portuguese West Africa (Field).

Distribution: Known only from Angola.

Specimens examined: *Mrs. Curtis*, cult. 1930 (type, Field; cotype, Gray).

A species offering a superficial resemblance in leaf outline and dissection to *C. oligoflora*.

75. **Coreopsis exilis** Sherff, Bull. Jard. Bot. Brux. 13: 288. 1935.

Herba perennis, erecta, gracillima, simplex, 0.5–1.25 m. alta, caule subtetragono glabro infra circ. 3 mm. supra circ. 1.2 mm. crasso. Folia petiolata petiolis tenuibus anguste marginatis glabris basi vix connatis 1.5–3 cm. longis, petiolo adjecto circ. 7–9 cm. longa, pinnatim 3–5-partita, foliolis oblonge lanceolatis (vel superiorum lineari-oblongis), pauciter acridentatis, membranaceis, pallidis, ciliatis, utrinque subsparsim adpresso-hispidis, apice acutis. Capitulum (unicum visum) pedunculatum pedunculo tenui glabrato +11 cm. longo, radiatum, pansum ad anthesin circ. 3.5 cm. latum et +1.5 cm. altum. Involucri bracteae aequilongae, exteriores circ. 8, adpressae, oblonge lineares, basim versus ciliatae ac moderate hispidae supra sparsim adpresso-hispidae vel glabrae, apice acutae, longitudinaliter saltem inferne 3-lineata lineis atris, 9–10 mm. longae; interiores ovato-oblongae, moderate adpresso-hispidae. Flores ligulati circ. 8, aurantiaci, ligula subovati, apice 2–3-denticulati, ±1.7 cm. longi. Paleae subacutae, glabrae vel aegre pubescentes, ovariorum aristis superatae. Flores tubulosi extrinsecus glabri, supra aurantiaci, corolla circ. 8 mm. longi. Achaenia matura

non visa. Ovaria plana, alata, anguste cuneato-obovata, supra marginibus faciebusque erecto-setosa, corpore circ. 5.5 mm. longa, biaristata aristis acerrimis stramineis infra antrorsum paucisetosis supra glabris circ. 4 mm. longis.

Type specimen: Collected by *P. Quarré*, No. 419 pro parte, on farm of H. Droogmans, Katuba, Katanga, Belgian Congo, May 15, 1927 (Bruss.; nom. indig. Kibunyubunyu).

Distribution: Katanga, Belgian Congo.

Specimens examined: *Quarré 419* pro parte (type, Bruss.).

Similar in habit to *C. Curtisii* of Angola but differing in exterior involucral bracts, which are appressed, moderately hispid below the middle, and about 9–10 mm. long (not reflexed, not *"glabrous except at very base,"* and not ±4 mm. long); in ovarial aristae, which are about 4 mm. long and somewhat antrorse-setose below (not ±1.5 mm. long and not extremely glabrous); etc. The median leaves of the type have the terminal leaflet linear-oblong, about 5 cm. long, and few-dentate (1–3 teeth on each side). Root described by Quarré as running ("racine tracante").

76. **Coreopsis oligoflora** Klatt, Leopoldina 25: 107. 1889. *C. oligantha* Klatt, Ann. Naturh. Hofmus. Wien 7: 103. 1892.

Involucri bracteae exteriores lineares, acriter apiculatae, circ. 1 mm. latae.....*C. oligoflora* sensu stricto.

Involucri bracteae exteriores late oblongae vel ovatae, apicaliter obtusissimae, saepius 2.5–4 mm. latae.....var. *β robusta*.

Herba erecta, annua, 5–10 dm. alta, ramosa ramis angulatis, caule ramisque sparsim pilis tenuissimis albis elongatis hispidis. Folia opposita, pilis tenuissimis argenteo-nitidis elongatis plus minusve hispida, breviter petiolata petiolis alato-marginatis basaliter connatis usque ad 1.5 cm. longis, petiolo adjecto 3–6 (–10) cm. longa, bipinnatisecta, segmentis majoribus ovatis vel lineari-lanceolatis, membranaceis, aegre atropunctulatis, dentatis dentibus acriter calloso-apiculatis. Capitula tenuiter pedunculata pedunculis saepius 7–13 cm. longis, radiata, pansa ad anthesin 4–6 cm. lata et circ. 1 cm. alta. Involucri hispidi bracteae exteriores circ. 8, lineares, nitide acriterque calloso-apiculatae, 6–10 mm. longi et circ. 1 mm. latae, interioribus oblongis plerumque aequales. Flores ligulati circ. 8, lutei vel aurantiaci, ligula oblanceolato-elliptici, apice integri vel minutissime denticulati, 2.5–3 cm. longi et usque ad 12 mm. lati. Disci florum stigmata terminaliter angustata. Achaenia late lineari-oblonga, nigra, plana, apicem versus minute erecto-setosa,

lateraliter alata alis 0.6–0.8 mm. latis, marginibus erecto-setosa, corpore circ. 8 mm. longa et cum alis circ. 3–3.5 mm. latis, apice erecto-setoso biaristata aristis tenuibus ±2 mm. longis antrorsum hispidis.

Type specimen: Collected by *Dr. Buchner*, No. 32, among bushes, Malange, Angola, Portuguese West Africa, March, 1879 (Berl.).

Distribution: Belgian Congo and southwestward across Portuguese West Africa.

Specimens examined (this list doubtless includes some specimens of the more recently described var. *robusta*): *L. Achten 253B*, Luobo-Kasai, Belgian Congo (Bruss.); *F. Allard 65*, Kuku Wungu, Belgian Congo, 1909 (Bruss.); *idem 330*, Kikubungu, Belgian Congo, 1910 (Bruss.); *Baum 878*, alt. 1,300 meters, between Kulei and Kutsi, Mambunda Region, southeastern Angola, Portuguese West Africa, April 29, 1900 (Berl.); *Bavicchi 14*, Esungume Dolo, Belgian Congo, 1913 (Bruss.); *J. Bequaert 113*, Bukama, Belgian Congo, May 12, 1911 (Bruss., 2 sheets); *Dr. Buchner 32* (type, Berl.); *J. Claessens 67*, Lubuku, Belgian Congo, September, 1907 (Bruss., 2 sheets); *idem 73*, Belgian Congo, August, 1907 (Bruss.); *idem 88*, Ka-Tembo, Belgian Congo, January 18, 1921 (Bruss., 2 sheets); *idem 400*, Koloko Konbe, Belgian Congo, January, 1910 (Bruss.); *F. Flamand*, Kiamohampa, Belgian Congo, September 20, 1911 (Bruss.); *J. Gillet 806* and *885*, Kisantu, Belgian Congo, 1900 (Bruss.); *P. Hamerlinck 1502* and *1512*, Wombali, Belgian Congo, 1914 (Bruss.); *Fr. Hens 45*, becoming shrubby and growing 1.5 meters high at alt. 270 meters, marsh of Stanley Pool, Belgian Congo, August 14, 1888 (Bruss.; Kew); *Em. Laurent*, between Lusambo and Lomani, Belgian Congo, December, 1895 (Bruss.); *idem & Marc. Laurent*, undergrowths, Kondue, Belgian Congo, November 25, 1903 (Bruss.); *Marc. Laurent 512*, Bolobo, Belgian Congo, April 15, 1905 (Bruss.); *E. Lescrauwaet 188*, Mokole (Lubi), Belgian Congo, September 12, 1904 (Bruss.); *Alexander von Mechow 33*, Pungo Andongo, Angola, Portuguese West Africa, January–April, 1879 (Berl., 2 sheets); *idem 459*, Malange, Angola, March, 1880 (Berl.); *Nélis*, Bokala, Belgian Congo, May, 1913 (Bruss.); *P. Pogge 257*, Belgian Congo, March, 1876 (Berl.); *idem 1282*, in cultivations, Mukenge tract (campine), Belgian Congo, November 6, 1881 (Berl.); *idem 1295*, eodem loco, March 15, 1882 (Berl.); *idem 1309*, prairie (campine) on the Lualaba River, southeastern Belgian Congo, April 24, 1882 (Berl.); *A. Sapin*, N'Dolo, Belgian Congo, May, 1906 (Bruss.); *idem*, N'Kolokosso, Belgian Congo, June 28, 1906 (Bruss.); *idem*, Sokomini Lake,

Sankuru (Lubilash) River, Belgian Congo, September, 1906 (Bruss.); *idem*, Katola Msek, Belgian Congo, April, 1908 (Bruss., 2 sheets); *idem*, growing on the plains, Munungu, Belgian Congo, April, 1910 (Bruss.); *R. Schlechter 12474*, Dolo, Belgian Congo, May–June, 1899 (Berl.; Bruss.; Kew); *Sparano 25*, "odor recalling slightly the marguerite," Belgian Congo, June 6, 1913 (Bruss.); *Hyacinthe Vanderyst*, Ndembo, Belgian Congo, August 20, 1906 (Bruss.); *idem*, eodem loco, January 7, 1907 (Bruss.); *idem*, Station at Inkissi Falls, Belgian Congo, May, 1907 (Bruss.); *idem*, Leopoldville, Belgian Congo, May 23, 1907 (Bruss.) and May 27, 1910 (Bruss.); *idem*, Kumpako, Belgian Congo, 1908 (Bruss.); *idem*, N'Boma, Belgian Congo, April 28, 1911 (Bruss.); *idem B224*, Lonzo, Belgian Congo, July 26, 1906 (Bruss.); *idem 700*, Wombali, Belgian Congo, May, 1913 (Bruss.); *idem 1099*, eodem loco, June, 1913 (Bruss.); *idem 1187*, Bandundu, Belgian Congo, June, 1913 (Bruss.); *idem 1341*, Wombali, Belgian Congo, June, 1913 (Bruss.); *idem 1582*, Bokala, Belgian Congo, July, 1913 (Bruss.); *idem 4304*, Bugunu, Belgian Congo, May 28, 1914 (Bruss.); *idem 4885*, Wombali, Belgian Congo, 1914 (Bruss.); *idem 10097*, Kamtsha, Belgian Congo, July, 1921 (Bruss.); *idem 20963*, Lulua-gare, Belgian Congo (Bruss.); *E. Verdick*, Lukafu, Katanga, Belgian Congo, March, 1900 (Bruss.); *F. C. Wellman*, alt. 1,500 meters, Bailundo District, Benguella (Benguela; Abunda) region, eastern Angola (Kew).

Often confused with *Bidens Steppia* (Steetz) Sherff, a species having more elongate exterior involucral bracts, mostly 11 or 12 slender-liguled ray florets instead of about 8 rather wide ones, leaves larger and more decompound, achenes practically exalate, etc.

Coreopsis oligiflora var. *β* **robusta** Sherff, Bot. Gaz. 90: 386. 1930.

A specie involucri bracteis exterioribus spathulato-oblongis vel oblongis vel ovatis saepius 2.5–4 mm. latis apicaliter obtusissimis differt.

Type specimen: Collected by *R. Büttner*, No. 408, Bolobo, Belgian Congo, November 5, 1885 (Berl.).

Distribution: Belgian Congo.

Specimens examined: *Joseph Bequaert*, Leopoldville, Belgian Congo, April 9, 1915 (Bruss.); *idem 7205*, Belgian Congo, March 29, 1915 (Bruss.); *Büttner 408* (type, Berl.); *De Giorgi 142*, Kisengwa, Belgian Congo, October, 1922 (Bruss.); *idem 231*, herb of the moist plain, Kanda-Kanda, Belgian Congo, November, 1922 (Bruss.); *D. H. Linder 1706*, moist places at edge of savanna, Bolobo, Belgian

Congo, December 16, 1926 (Berl.); *P. Pogge 1292*, Mukenge tract (campine), Belgian Congo, April 13, 1882 (Berl.); *P. Quarré 2173*, 7–9 dm. tall, on plateau, Saeomintra, Belgian Congo, November, 1930 (Bruss., 2 sheets); *idem 2826*, growing 1 meter tall, Pastorale, Division of Lualu, Belgian Congo, November, 1931 (Bruss., 2 sheets); *idem 2921*, herb 1.2 meters tall, Lovoi, Kamina, Belgian Congo, March, 1932 (Bruss., 2 sheets); *Walter Robyns 138*, much branched at base, ±1.5 meters tall, right bank of Guhisi, beyond railroad, Kisantu, Belgian Congo, July 3, 1925 (Bruss.); *H. Vanderyst 12366*, between La Labue and La Loange, Belgian Congo, October, 1922 (Bruss.); *idem 21227*, Belgian Congo (Bruss.); *F. Vermoesen 2403*, Belgian Congo, September, 1919 (Bruss., 2 sheets).

Dr. Otto Hoffmann had designated the type varietally under the name *C. oligantha* Klatt in the Berlin Herbarium, but I have not as yet found that he ever published the varietal name.

77. **Coreopsis Quarrei** Sherff, Bull. Jard. Bot. Brux. 13: 289. 1935.

Herba annua, gracilis, erecta, ±5 cm. alta, caule moderate erecto-ramoso glabrato nunc 1 nunc ±2.2 mm. crasso. Folia petiolata petiolis usque ad 1.3 cm. longis setoso-ciliatis setis pluriloculatis, petiolo adjecto usque ad 5 cm. longa, bipinnatisecta, foliolis membranaceissimis acute dentatis lobulatisve supra moderate infra (interdum sparsius) adpresso-hispidis. Capitula radiata, pansa ad anthesin ±4 cm. lata et circ. 1 cm. alta, tenuiter pedunculata pedunculis caulem ramosve terminantibus glabris vel summam versus aegre setosis usque ad 1.2 dm. altis. Involucri demum hemisphaerico-depressi bracteae exteriores circ. 7 vel 8, glabratae vel aegre hispidae, lineari-oblongae, supra interdum dilatatae, apice rotundatae vel subacutae, 3–4 mm. longae, quam interiores ovato-oblongae sparsim setosae dimidio breviores. Flores ligulati ±8, aurei, lineari-oblongi, apice integri vel bidenticulati, ±2.3 cm. longi. Paleae oblongae vel lineari-oblongae, apice subcolorato obtusissimae vel subtruncatae, 6–7.5 mm. longae. Flores tubulosi circ. 4 mm. longi, extrinsecus praecipue ad tubi summam saepe patenti-hispidi. Achaenia plana, brunneo-atra, obovata vel oblonga, alata, corpore 3.5–6 mm. longa et alis inclusis 2–2.5 mm. lata, corporis plurisulculati ipsius facie ventrali erecte setosa setis e tuberculo ortis, facie dorsali non nisi apicem versus tuberculato-setosa, marginibus pectinato-tuberculatis saepius brunneis flavisve numerose erecto-setosa, apice erecte setulosa ac minutissime biaristata aristis tenuibus antrorsum hispidis sub 0.5 mm. longis.

Type specimen: Collected by *P. Quarré*, No. 419 pro parte, on farm of H. Droogmans, Katuba-Elisabethville, District of Upper Katanga, Belgian Congo, May 16, 1927 (Bruss.).

Distribution: District of Upper Katanga, Belgian Congo.

Specimens examined: *Quarré 419* pro parte (type, Bruss.).

Confused by *Quarré* with *C. exilis*, from which it differs in being an annual, having the exterior involucral bracts 3–4 mm. long and a half shorter than the inner ones, the achenial bodies varying from 3.5 to 6 mm. long, the aristae less than 0.5 mm. long, etc. *C. exilis* is perennial, has involucral bracts subequal and 9–10 mm. long, achenial bodies about 5.5 mm. long, aristae about 4 mm. long, etc.

78. **Coreopsis Goffardii** Sherff, Bull. Jard. Bot. Brux. 13: 290. 1935.

Herba annua, erecta, 2.5–8 dm. alta; caule glabro, subtetragono, purpurascenti, suberecte ramoso. Folia petiolata petiolis marginatis sparsim hispidis (setis pluriloculatis) 1–3 cm. longis, petiolo adjecto usque ad 1 dm. longa, 2–3-pinnatisecta rhachi petiolo marginato simile; segmentis ultimis nunc oblongis nunc obovato-oblongis nunc plus minusve lanceolatis, utrinque moderate adpresso-hispidula et saepe praecipue supra minutissime glandulosa, membranacea, dentibus saepius subabrupte minutissimeque apiculatis. Capitula ramulos tenues hispidos 1–7 cm. longos terminantia, radiata, pansa ad anthesin ±3 cm. lata et ±11 mm. alta. Involucrum hemisphaericum basi dense superne subsparsim adpresso-hispidum, bracteis exterioribus circ. 8, lineari-oblongis, superne saepe latioribus, tergo longitudinaliter 1–3-atronerviis, apice acutis vel subacutis, circ. 4–5 mm. longis, quam interioribus oblongo-ovatis paulum brevioribus. Flores ligulati circ. 8, aurantiaci, ±1.5 cm. longi, ligula anguste oblongi, inferne glabrati superne minutissime adpresso-hispiduli, apice subintegri. Paleae oblongae, apice obtusae rotundataeve ac erecte ciliolatae, ad anthesin quam corollae tubulosae breviores. Flores tubulosi extrinsecus glabra vel tubi summa (anulo) hispiduli, dentibus saepius aurantiaci, 4–5 mm. longi. Ovaria (achaeniis maturis deficientibus) plana, oblongo-obovata, faciebus glabratis mediane paucistriata, alata, corpore sub 3 mm. longa, marginibus infra obsolete eroso-denticulata summam versus erecte setosa, apice cuneato-emarginato erecte setosa ac biaristata aristis tenuibus antrorsum hispidulis sub 0.5 mm. longis.

Type specimen: Collected by *P. Quarré*, No. 1616, on Mr. Goffard's farm, Kipila-Elisabethville, District of Upper Katanga, Belgian Congo, May, 1929 (Bruss.).

Distribution: Known only from type locality in District of Upper Katanga, Belgian Congo.

Specimens examined: *Quarré 1616* (type, Bruss.).

79. **Coreopsis vulgaris** Sherff, Bull. Jard. Bot. Brux. 13: 291. 1935.

Herba annua, erecta, ±4 dm. alta, caule glabrato plus minusve tetragono, apicem versus suberecte ramoso. Folia petiolata petiolis tenuibus patenti-ciliatis interdum submarginatis usque ad circ. 2 cm. longis, petiolo adjecto circ. 5–8 cm. longa, 2–3-pinnatifida, segmentis primariis ±5 ovatis vel ovato-lanceolatis, ultimis membranaceis utrinque adpresso-hispidis dentatis dentibus acriter apiculatis. Capitula pauca (±7), pedunculata pedunculis subrobustis sparsissime patenti-hispidis (setis crispis albidisque) 1–4 cm. longis, radiata, pansa ad anthesin circ. 3–3.5 cm. lata et ±1.2 cm. alta. Involucrum magnum depresso-hemisphaericum, ±2 cm. latum et ±1 cm. altum, setis acerrimis crispis albidis basi dense alibi subsparsim conspersum; bracteis exterioribus circ. 8, lineari-oblongis, longitudinaliter circ. 3-lineatis lineis atris, apice obtusis vel acutis, 6–11 mm. longis; interioribus ovato-lanceolatis, apice glanduloso-hispidulis, saepius 8–10 mm. longis. Flores ligulati circ. 8, flavi, ligula lineari-oblongi, apice integri vel subintegri, circ. 1–2 cm. longi. Paleae oblongae, apice atriore subrotundatoque vix apiculatae, aristis superatae. Flores tubulosi extrinsecus glabri. Achaenia non visa. Ovaria plana, oblonga vel obovata, faciebus glabrata, marginibus (infra breviter supra longe) apiceque erecto-setosa, alata, corpore alis inclusis 3–4 mm. longa et 1–1.5 mm. lata, biaristata aristis tenuibus antrorsum hispidis circ. 2.5–4 mm. longis et corollae tubum dimidio superantibus.

Type specimen: Collected by *A. Becquet*, No. 62, at altitude of 1,000 meters, common on savanna, flowering entire year except in dry season, Mukishi-Lomam, District of Middle Katanga, Belgian Congo, September, 1927 (Bruss.).

Distribution: District of Middle Katanga, Belgian Congo.

Specimens examined: *Becquet 62* (type, Bruss.).

The annual habit, large discs, and comparatively inconspicuous rays combine to give this species the appearance of an unattractive weed.—Referred to *Coreopsis* (instead of *Bidens*) with some hesitancy, since it is not known that the mature achenes are alate.

80. **Coreopsis Giorgii** Sherff, Bull. Jard. Bot. Brux. 13: 292. 1935.

Herba annua, erecta, ±1 m. alta, caule glabro subtetragono tenuiter ramoso. Folia petiolata petiolis tenuibus anguste marginatis hispido-ciliatis circ. 1–1.5 cm. longis, petiolo adjecto ±7 cm. longa, bipinnatifida, segmentis secundariis oblongo-lanceolatis vel ovato-lanceolatis membranaceis infra moderate supra subsparsim adpresso-hispidis acriter dentatis. Capitula subnumerosa subcorymbose ad ramorum apices disposita, pedicellata pedicellis sparsissime setosis 3–6 cm. longis, radiata, pansa ad anthesin circ. 2.5–3.3 cm. lata et circ. 8–9 mm. alta. Involucrum moderate adpresseque albido-setosum, bracteis exterioribus oblongo-linearibus, apice induratis atque acutis subobtusisve 4–6 mm. longis quam interioribus ovato-lanceolatis plerumque brevioribus. Flores ligulati circ. 8, flavi, ligula lineari-oblongi, apice integri vel minutissime denticulati, circ. 1.5–2 cm. longi. Paleae glaberrimae, cuneate oblanceolatae, apice atriore rotundatae. Flores tubulosi glabri. Achaenia valde obcompressa, nitide brunneo-atra, faciebus pluristriata et (praecipue secundum medium atque apicem versus) erecto-setosa, alarum marginibus minutissime numerosissimeque erecto-setulosa, corpore alis inclusis exteriora ±7 mm. longa et ±3.2 mm. lata interiora ±1 cm. longa et ±1.7 mm. lata, omnia apice densissime erecto-hispida et biaristata aristis perspicue densissimeque erecto-hispidis circ. 1 mm. longis, setulis stramineo-fulvis.

Type specimen: Collected by *De Giorgi*, No. 170, Katompe, District of Middle Katanga, Belgian Congo, October, 1922 (Bruss.).

Distribution: District of Middle Katanga, Belgian Congo.

Specimens examined: *De Giorgi 170* (type, Bruss.).

Related to *C. oligoflora* and *C. Mattfeldii*. From *C. oligoflora* it differs at once in having the exterior involucral bracts 4–6 (not 6–10) mm. long, the ligulate florets about 1–2 (not about 2.5–3) cm. long, etc. From *C. Mattfeldii* it differs in having the exterior achenes, wings included, about 3.2 (not 4–5) mm. wide, etc.

81. **Coreopsis Mattfeldii** Sherff, Bot. Gaz. 76: 83. 1923.

Herba erecta, ramosa, verisimiliter circ. 7–10 dm. alta, caule subtetragono, glabrato vel disperse piloso, sulcato. Folia petiolata petiolis latis ±1 cm. longis, petiolis adjectis 4–10 cm. longa, pinnatisecta, utrinque moderatim pilosa, margine parce ciliata, laciniis oppositis indivisis vel pinnatisectis, segmentis ultimis linearibus (2–6 mm. latis), acutis atque indurato-apiculatis. Capitula corymbosa, radiata, pansa ad anthesin circ. 3.5–4 cm. lata et 9 mm. alta. Involucri bracteae dorso hispidae pilis albis multiloculatis atque ad basim tumidis, aequilongae (5–8 mm.), exteriores lineari-spathu-

latae, interiores ovato-lanceolatae. Flores ligulati circ. 8, flavi, ligula lanceolati vel obovato-lanceolati, striati, apice obscure minuteque denticulati, 1.6–2 cm. longi et 4–9 mm. lati. Paleae hyalinae late oblongae, apice subobtusae, circ. 8 mm. longae. Disci florum stigmata angustatissimo-caudata. Achaenia valde obcompressa, nigrescentia, alata alis 1–1.5 mm. latis, faciebus glabra vel ad costas (et supra sparsim) hispida, margine apiceque hispida, biaristata aristis tenuibus stramineis sursum hispidis 1–2 mm. longis, exteriora obovata 6–8 mm. longa et (alis inclusis) 4.25–5 mm. lata, interiora oblanceolata circ. 8 mm. longa et (alis inclusis) 4 mm. lata.

Type specimen: Collected by *Alexander Carson*, No. 75, Fwamba, Lake Tanganyika, German East Africa, 1894 (Berl.).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Carson 75* (type, Berl.; cotype, Kew).

Named very appropriately after Dr. Johannes Mattfeld, who most generously assisted in placing at my disposal many of the Berlin Herbarium specimens of African *Coreopsis* and *Bidens* for detailed study. It bears a strong superficial resemblance to *Bidens Steppia* (Steetz) Sherff, but can easily be distinguished by its achenes and involucral bracts. The many mature achenes on the type differ remarkably from the ones on the type and other specimens (already cited in my monograph of the genus *Bidens*) of *Bidens Steppia*. For *B. Steppia* they are at most widely oblong-linear in outline, 7.5–9 mm. long and 2.5–3 mm. wide; there is merely a thickened lateral ridge, wings being absent. For *Coreopsis Mattfeldii* the achenes are much thinner and wider, the outer ones being obovate, 6–8 mm. long and 4.25–5 mm. wide, the inner ones being oblanceolate, about 8 mm. long and 4 mm. wide; all are winged, and even on submature fruiting heads the rounded upper ends of the wings, adjacent to the aristae, are easily visible to the eye. The external bracts about equal the inner ones in length in *C. Mattfeldii;* in *Bidens Steppia* they tend to exceed the inner ones by 2–6 mm.

The nearest ally in *Coreopsis* is *C. oligiflora* Klatt.

82. **Coreopsis injucunda** Sherff, Bull. Jard. Bot. Brux. 13: 293. 1935.

Herba annua, erecta, ramosa, 4–10 dm. alta, caule ramisque subtetragonis glabris. Folia petiolata petiolis tenuibus marginatis hispido-ciliatis setis pluriloculatis usque ad ±2.5 cm. longis, petiolo adjecto ±6 cm. longa, bipinnatisecta segmentis linearibus subacriter

apiculatis membranaceis utrinque marginibusque sparsim albido-hispidis. Capitula moderate numerosa, pedunculata pedunculis ramos terminantibus sparsim hispidis tenuibus saepius 1–1.5 dm. longis, radiata, pansa ad anthesin circ. 4–4.5 cm. lata et 1.2–1.4 cm. alta. Involucri hispidi bracteae exteriores circ. 8, subulato-lanceolatae, basi connatae, apice acutae, circ. 4–6 mm. longae, quam interiores oblongo-ovatae paulo breviores. Flores ligulati circ. 8, flavi, ligula oblonge lineares, apice integri, circ. 2.5 cm. longi. Paleae oblongae, apice obtusissimae vel subtruncatae, achaeniorum aristas superantes. Florum tubulosorum corollae circ. 5 mm. longae, extus glabrae. Achaenia plana, atra, obovata vel oblonga, corpore 4.5–6.5 mm. longa et alis inclusis circ. 2–2.3 mm. lata, faciebus pluristriata dorsali parce ventrali moderate erecto-setulosa, marginibus apiceque numerose erecto-ciliata, biaristata aristis tenuibus stramineis antrorsum hispidulis sub 1 mm. longis.

Type specimen: Collected by *P. Quarré*, No. 1662, on Mr. Goffard's farm, Kipila-Elisabethville, District of Upper Katanga, Belgian Congo, May, 1929 (Bruss., 2 sheets).

Distribution: District of Upper Katanga, Belgian Congo.

Specimens examined: *Quarré 1662* (Bruss., 2 type sheets).

83. **Coreopsis Borianiana** Schz. Bip. ex Schweinf. Verh. Zool. Bot. Ges. Wien 18: 684. 1868. *C. Borianiana* var. *cannabina* Schz. Bip. loc. cit. *C. guineensis* O. & H. in Oliver, Fl. Trop. Afr. 3: 390. 1877; etiam in Hutch. & Dalz. Fl. West Trop. Afr. 2: 143, *f. 217*. 1931. *C. Chevalieri* O. Hoffm. & Muschl. Bull. Soc. France 57, Mém. 8: 118. 1910. *C. chrysopterocarpa* Chiov. Ann. Bot. Roma 9: 75. 1911.

Involucri bracteae exteriores 9–12, uniseriales, 0.7–1.5 cm. longae. *C. Borianiana* sensu stricto.

Involucri bracteae exteriores 18–22, biseriales, plerumque 1.4–1.8 cm. longae..... var. *β multiplex*.

Herba annua, erecta, plus minusve glabra, 6–1.5 dm. alta, caule aegre subtetragona vel etiam fere teres. Folia opposita saepius breviter petiolata petiolis latis marginatis plerumque 3–12 mm. longis, petiolo adjecto 5–13 (etiam –18) cm. longa, simplicia vel 2–3-partita, lamina segmentisve remote acriterque denticulatis (denticulis saepe subcapilliformibus), linearibus, utrinque elongato-angustatis, plerumque 4–10 mm. latis, membranaceis, minutissime spinuloso-ciliatis. Capitula non numerosa, tenuiter pedunculata pedunculis 5–18 cm. longis ad apicem saepe abrupte dilatatis ac

paucis bracteis bracteae involucri exterioris valde similibus obsitis, radiata, pansa ad anthesin 5–7 cm. lata et 1.3–2 cm. alta. Involucri bracteae exteriores 9–12, uniseriales, anguste lineares, tergo glabrae vel hispidae, ad apicem saepe minute spinuloso-ciliatae, acriter vel subacriter (saepe indurato-) apiculatae, 0.7–1.5 cm. longae et 0.6–1 mm. latae; interiores lanceolato-oblongae vel ovato-oblongae, apice plerumque dorso interdum pubescentes, saepius paulo longiores. Flores ligulati circ. 8, aurei, ligula obovato-oblongi, 8–14-striati, apice obtuso obscure vel manifeste denticulati, 2.5–3 cm. longi et 8–14 mm. lati. Paleae oblongo-oblanceolatae, demum interdum crassiusculae, circ. 10–18 mm. longae et 2.5–4.5 mm. latae. Disci florum stigmata caudato-appendiculata. Achaenia valde obcompressa, alata, circumambitu (alis inclusis) ovato-orbiculata, corpore ipso nigra lineari-oblonga tuberculato-setosa 9–15 mm. longa et 1.2–2.3 mm. lata, alis badia vel argentea nitida dense setoso-ciliata circ. 2.8–3.8 mm. lata, apice setosa et biaristata aristis erectis, sursum hispidis, circ. 2.5–4 mm. longis.

Type specimen: Collected by *Boriani*, No. 42, in the Fesoglu, northeastern Africa, 1839 (Mus. V.).

Distribution: Across Africa from Eritrea to Sénégal and reaching southward to Kamerun and Togo.

Specimens examined: *C. Barter 933*, Nigeria, 1857–1859 (Berl.; Gray); *Boriani 42* (type, Mus. V.; etiam fragmentum typi in herb. Schz. Bip. in Par.); *Aug. Chevalier 2083*, Koulitsoro, Sudan, 1899 (Berl.; Bruss.); *idem 9633*, Massenya (Massenia), Bagirmi (Baguirmi), Sudan, 1902–1904 (Berl.); *idem 9721*, Kolkélé and Moito, Dar-el-Hadjer, Baguirmi Nord, Territory of Chari, September 6–9, 1903 (*herb. Chevalieri;* type of *C. Chevalieri* O. Hoffm. & Muschl.); *Dr. Kersting 14*, alt. 350 meters, Trógode, Kerkri, Togo, October 28, 1897 (Berl.); *idem 422*, alt. 400 meters, Sokodé-Basari, Togo, October, 1901 (Berl.); *Lécard 290*, Sénégal (Bruss.); *C. Ledermann 5243*, growing 1–1.5 meters high, alt. 380 meters, between Tschamba and Doreba, Kamerun, September 18, 1909 (Berl., 2 sheets); *A. Pappi 7733*, alt. 1,000 meters, Baza Cunama-Barentù, Erythrea, November 28, 1908 (Flor., type of *Coreopsis chrysopterocarpa* Chiov.); *T. Pfund*, Dar-Fur, 1876 (Berl.); *idem 336*, Takari on the Rahad, Kordofan, July, 1875 (Berl., 2 sheets); *Dr. Rowland*, common in savannas, western Lagos, 1893 (Berl., 2 sheets); *F. Schroeder 74*, alt. 350 meters, Sokodé Farm, Togo, October 19, 1900 (Berl., 2 sheets); *G. Schweinfurth* (Flora of Gallabat *No. 439*), Matamma, Gallabat (Galabat) region, northwestern Abyssinia, middle of October, 1865 (herb.

Schz. Bip. in Par.); *idem* (Flora of Gallabat *No. 585*), eodem loco et tempore (Berl., type material of var. *cannabina* Schz. Bip.).

Coreopsis Chevalieri O. Hoffm. & Muschl., based on *Aug. Chevalier 9721*, is seen from its type specimen (which was very kindly obtained for my study from the Chevalier Herbarium by Dr. H. Humbert of Paris) to belong here.

Coreopsis Borianiana var. *β* **multiplex** Sherff, Bot. Gaz. 90: 385. 1930.

A specie involucri bracteis exterioribus biserialibus 18–22, plerumque 1.4–1.8 cm. longis quam interioribus saepe longioribus differt.

Type specimen: Collected by *"Graf. Zech."* under No. 168, Kete Kratschy, Togo, October 21, 1898 (Berl.).

Distribution: Known only from type locality in Togo.

Specimens examined: *Zech. 168* (type, Berl.).

84. **Coreopsis togensis** Sherff, Bot. Gaz. 76: 87. 1923.

Herba perennis, caule glabro, rubro-viridi, sulcato, subtetragono, usque ad 2 m. alto. Folia petiolata petiolis 0.5–4 cm. longis, petiolo adjecto 10–18 cm. longa et usque ad 20 cm. lata, pinnatim 3- vel 5-partita, foliolis lanceolatis, apice saepe longe attenuatis, grosse vel moderatim serratis dentibus acriter apiculatis infra pallidioribus, margine minute ciliatis, aliter glabris, lateralibus usque ad 11 cm. longis et 3 cm. latis, terminali usque ad 16 cm. longo et 4 cm. lato. Capitula pauca, longe pedunculata pedunculis maximam partem glabris usque ad 18 cm. longis, radiata, pansa ad anthesin 7–9 cm. lata et circ. 1.5 cm. alta. Involucrum non plerumque pubescens nisi basi, bracteis exterioribus 7–10, magnis, foliaceis, lanceolatis, apice angustatis, interdum ciliatis, 1–2 (et etiam usque ad 4) cm. longis, interiores lanceolatas aequantibus, vel multo superantibus. Flores ligulati 7–9, lutei, ligula late elliptico-lineares vel ovato-oblanceolati, apice minute vel grosse profundeque (sinu usque ad 1 cm. alto) dentati, 3–4.5 cm. longi et 0.7–2 cm. lati. Paleae tenuiter lineari-oblongae pluribus lineis percursae apice subacutae, omnino plus minusve flavidae, 1–1.5 cm. longae. Disci florum stigmata angusto-elongata. Achaenia obcompressa, brunneo-atra, oblongo-linearia, plerumque alata, margine antrorsum ciliata, supra faciebus et apice erecto-hispida, corpore 8–10 mm. longa et (alis inclusis) 2.5–3 mm. latis, biaristata aristis nudis vel basim versus antrorsum 1- vel 2-spinulosis, circ. 1 mm. longis.

Type specimen: Collected by *R. Buettner*, No. 142, on steppe behind Ketzabenki, Togo, August 29, 1890 (Berl., 2 sheets).

Distribution: Togo.

Specimens examined: *Buettner 142* (Berl., 2 type sheets); *W. Busse 3416*, at alt. of about 700 meters, Hausberg, near Misahoehe, Togo, December 7, 1904 (Berl., 2 sheets); *Kling 60*, Jege, Bismarckburg, Togo, 1889 (Berl.); *idem 166*, eodem loco, October 30, 1889 (Berl.).

On the type specimens the exterior involucral bracts are much larger than in Busse's specimens, being twice the length of the inner ones. The type has also larger leaves and ligulate florets, some of the ligules reaching 2 cm. in width, but all the other characters are too much alike to warrant specific or probably even varietal separation of the Busse plants. The achenial measurements are taken from Busse's plants, as the achenes of the type are immature.

85. **Coreopsis scabrifolia** Sherff, Bot. Gaz. 76: 86. 1923.

Herba simplex vel parce ramosa, caule quadrangulato, glabro, sulcato, perenni e basi lignea, verisimiliter circ. 1 m. alto, non robusto. Folia nunc sessilia, nunc petiolata petiolis alatis et elongatis usque ad 4 cm. longis, petiolo adjecto 8–15 cm. longa et 1–3 cm. lata, lanceolata (raro oblanceolato-linearia), indivisa (raro pauca pinnatim lobata), acriter et interdum grosse dentata, utrinque acuminata vel tantum acuta, scabra, minute spinuloso-ciliata, infra ad venas sparsim piloso-hispida et pallidiora. Capitula pauca (1–4), subtenuiter pedunculata pedunculis maximam partem glabris 3–12 cm. longis, radiata, pansa ad anthesin 5–6 cm. lata et circ. 1 cm. alta. Involucri bracteae exteriores 8–11, lineares vel lineari-lanceolatae, dorso basi hispidae, 1–1.5 cm. longae, interiores lanceolatas aequantes vel paulo superantes. Flores ligulati circ. 8, flavi, ligula elliptici vel ovato-lanceolati, 2–2.5 cm. longi et 5–12 mm. lati. Paleae tenuiter lineari-oblongae, circ. 5–7-purpureo- vel brunneo-striatae, circ. 1 cm. longae. Disci florum stigmata incrassata terminaliter caudata. Achaenia (alis inclusis) brunneo-atra, late linearia, valde obcompressa, moderatim sed inconspicue alata, antrorsum setosa, corpore 9–11 mm. longa et (alis inclusis) 2–3 mm. lata, biaristata, aristis nudis vel sursum 1–3-spinulosis, 1.5–2.5 mm. longis.

Type specimen: Collected by *T. Kassner*, No. 2776, under trees, Kundelungu, Belgian Congo, May 15, 1908 (Berl.).

Distribution: Southeastern Belgian Congo.

Specimens examined: *S. De Giorgi*, vicinity of Elisabethville, Belgian Congo, 1923 (Bruss.); *Homblé 329*, bordering stream,

eodem loco, May, 1912 (Bruss., 2 sheets; nom. indig., musombé); *Kassner 2776* (type, Berl.: cotypes, Brit., 2 sheets).

The general habit is deceivingly like that of *Bidens Baumii* (O. Hoffm.) Sherff, and, were it not for the achenial and involucral differences, distinction between the two would be at times difficult.

86. **Coreopsis palmata** Nutt. Gen. Amer. 2: 180. 1818. *Calliopsis palmata* Spreng. Syst. Veg. 3: 611. 1826. *Coreopsis pauciflora* Lehm. Ind. Sem. Hort. Hamb. 1833; cf. Linnaea 10: Litt. 76. 1836. *Coreopsis praecox* Fresen. Linnaea 13: Litt. 93. 1839; cf. Ind. Sem. Hort. Bot. Francofurt. 1838.

Herba perennis, erecta, 5–9 dm. alta, caulibus ad basim horizontalem radicantibus glabris vel ad nodos hirsutis, simplicibus vel paulo ramosis, tetragonis, foliosis. Folia opposita, principalia (summa plerumque indivisa exclusa) petiolata petiolis planis alatis 0.4–2.5 cm. longis et 3–6 mm. latis, petiolo adjecto 2–7 cm. longa, rigida, crassiuscula, suberecta, pedato- vel palmato-tripartita segmentis integris vel irregulariter 2–3-lobatis, segmentis (vel lobis) ultimis petiolo similibus oblongo-linearibus supra atque infra glabra marginibus scabrido-ciliatis apice saepius obtusis vel subrotundatis, plerumque 3–6 mm. latis. Capitula plerumque 1–3 (rarius usque ad 6), breviter pedunculata pedunculis glabratis 1–4 cm. longis, radiata, pansa ad anthesin nunc 2.5–3.5 nunc etiam 4–6 cm. lata, 0.9–1.5 cm. alta. Involucri bracteae exteriores 8–12, late linearioblongae, pallidae, obtusae, tergo glabrae, marginibus scabrido-ciliatae, 5–9 mm. longae, interdum subbiseriatim dispositae, quam interiores oblongo-obovatae irregulariter (et praecipue superne) ciliolatae paulo breviores. Flores ligulati circ. 8, flavi, ligula oblongo-obovati, apice plus minusve rotundato obsolete dentati, 1.5–2.7 cm. longi. Paleae angustissime oblongo-lineares (filiformes), supra moderate dilatatae, apice acutae, demum ±6.5 mm. longae. Florum tubulosorum stylorum rami anguste conico-appendiculati. Achaenia valde obcompressa, elliptico-oblonga, basim versus attenuata, glabra, subnigra, anguste alata, apice alis productis breviter bidentata, omnino 5–6.5 mm. longa et 1.8–2.3 mm. lata.

Type specimen: No particular specimen cited. Habitat given by Nuttall as "on the open plains of the Michigan Territory, Illinois, and Lower Louisiana."

Distribution: Wisconsin and eastern Manitoba southwardly to Indiana, Missouri, and Oklahoma.

Specimens examined: *J. A. Allen*, Iowa (Field); *C. F. Baker*, St. Croix Falls, northwestern Wisconsin, August 15, 1900 (Gray);

C. R. Barnes, Converse, Missouri, June 30, 1877 (Field); *M. S. Bebb*, prairies, Winnebago County, Illinois, September, 1859 (Gray); *idem*, prairies, Marion County, Illinois, 1860 (Field); *Robert Bebb 50*, Clarke, Indiana, 1894 (Field); *idem 1048*, open hillside, Lauderdale, Wisconsin, July 19, 1902 (Field); *H. C. Benke 3967*, Crystal Lake, Illinois, June 30, 1923 (Field); *O. W. Blakley 1451*, in woods near Page, Oklahoma, June 20, 1914 (Gray); *E. Bourgeau*, Winnipeg Valley, Canada, 1859 (Berl.); *Fred Brendel*, Peoria, Illinois (Field); *idem*, Illinois (Berl.); *Buckley*, Illinois (Gray); *B. F. Bush 160*, Montier, Missouri, June 30, 1894 (Berl.; Gray); *idem 3249*, prairies, Purdy, Missouri, August 17, 1905 (Gray); *I. W. Clokey 2428*, dry prairie soil, Niantic, Illinois, June 29, 1915 (Field; Gray); *George L. Clothier & H. N. Whitford 1037*, prairies, Brown County, Kansas, July 30, 1897 (Gray); *Robert Combs & C. R. Ball 517*, Ames, Iowa, June 25, 1897 (Berl.; Gray); *John M. Coulter*, field near LaPorte, Indiana, July 22, 1878 (Field); *idem*, Kankakee River, Indiana, 1882 (Field, 2 sheets); *R. I. Cratty*, Iowa (Field); *idem*, Armstrong, Iowa, July 18, 1897 (Gray); *idem 16*, Emmet County, Iowa, 1879 (Field); *Arthur W. DeSelm 275* and *276*, south of Monee, Illinois, July 6, 1913 (Field); *idem 394*, highways near Otto, Illinois, July 19, 1913 (Field); *F. W. Dewart*, St. Cloud, Minnesota, September, 1892 (Mo.); *H. Eggert*, St. Louis, Missouri, June 29, 1875 (Berl., 2 sheets); *idem*, dry ground, eodem loco, June 18, 1886 (Gray); *idem & Sydow*, prairie and dry hills, eodem loco, July 1, 1874 (Gray); *W. H. Emig 146*, along roads near Duroc, Missouri, July 2, 1913 (Mo.); ex herb. *T. J. & M. F. L. Fitzpatrick*, common, woods and prairies, Allamakee County, Iowa, June 27, 1895 (Field); *W. D. Frost*, Willmar, Minnesota, July, 1892 (Berl.); *Frank C. Gates 598*, Ravenswood, Illinois, July 17, 1905 (Field); *idem 3148*, Zion City, Illinois, July 19, 1909 (Field); *H. A. Gleason*, in the black oak association, Shirland, Illinois, June 29, 1908 (Gray); *idem*, bunch-grass prairies, Milroy, Illinois, July 6, 1908 (Gray); *idem 326*, Forsythe, Illinois, June 10, 1896 (Gray); *Elihu Hall*, dry, open timber lands, Athens, Illinois, 1861 (Field, 2 sheets); *J. R. Heddle 698*, Madison, Wisconsin, August 1, 1907 (Field); *W. Hoffman*, Corn Creek, Ozark Region, Missouri, June 21, 1870 (Berl., 2 sheets); *J. M. Holtzinger*, Lamoille, Minnesota, June, 1895 (Field); *E. W. D. Holway*, prairies, Decorah, Iowa, July 16, 1888 (Field); *Hortus Lipsiae*, ex Illinois (Berl.); *D. Houghton*, 200 miles above Falls of St. Anthony, upper Mississippi River (Gray); *idem*, dry prairie of upper Mississippi River above Falls of St. Anthony, July, 1832 (N.Y.); *O. E. Lansing, Jr. 307*,

prairie soil, Hammond, Indiana, June 28, 1898 (Field); *idem 2797*, roadside, Chicago, Illinois, July 19, 1910 (Field; Gray); *idem 3113*, alt. 445 meters, fallow field east of Mansfield, Missouri, June 5–12, 1911 (Field; Gray); *I. A. Lapham*, Milwaukee, Wisconsin (Gray); *Leavenworth*, Louisiana (Gray); ex *Lehmannio ipso* sub nom. *Coreopside pauciflora* (Gray; N.Y.); *Ray N. Lloyd*, prairies, Ravenswood, Illinois, July 11, 1887 (Field); *W. H. Manning*, Lake City, Minnesota, August 13, 1883 (Gray); *F. E. McDonald*, dry prairies, Peoria, Illinois, June, 1891 (Field); *idem*, eodem loco, 1900–1901 (Field); *idem*, eodem loco, June, 1904 (Gray); *idem*, eodem loco, June, 1915 (Field); *Mead*, Illinois, 1850 (Gray); *Edgar A. Mearns 144*, Fort Snelling, Minnesota, July 16, 1888 (Field); *R. T. Morgan*, vicinity of Fountaindale, Illinois, August, 1877 (Berl.); *E. J. Palmer 18078*, dry, open woods, near Ironton, Missouri, June 26, 1920 (Gray); *Harry N. Patterson*, prairies near Oquawka, Illinois, July (Field); *idem*, near Oquawka, June 20, 1872 (Field); *A. S. Pease*, dry soil south of Champaign, Illinois, October 9, 1920 (Gray); *idem 12394*, Champaign, September 11, 1909 (Gray); *Donald C. Peattie 8*, moist prairie, East Chicago, Indiana, July 31, 1920 (Field); *Ns. Riehl 41*, hills, St. Louis, Missouri, June, 1838 (Berl.); *Benjamin L. Robinson*, Normal, Illinois, July, 1887 (Gray); *C. O. Rosendahl 656*, Spring Grove, Minnesota, June 30, 1902 (Gray); *J. H. Sandberg*, Hennepin County, Minnesota, August, 1889 (Field, 2 sheets); *idem*, copses, eodem loco, July, 1890 (Field); *Savage & Stull 60*, Ironton, Missouri, June 16, 1897 (Field); *J. H. Schuette*, St. Anthony Park, Minnesota, July 2 and 14, 1888 (Field); *idem*, eodem loco, July 8, 1888 (Field; Gray); *idem*, St. Anthony, Minnesota, July 16, 1888 (Field); *idem*, Plover, Wisconsin, July 26, 1888 (Gray); *idem*, Green Bay, Wisconsin, August 13, 1899 (Gray); *idem*, Green Lake, Wisconsin, August 13, 1899 (Field); *E. P. Sheldon*, Sleepy Eye, Minnesota, July, 1891 (Field); *idem*, Fort Snelling, Minnesota, June, 1895 (Field); *Earl E. Sherff 284*, St. Louis, Missouri, July 7, 1910 (Gray); *idem 1642*, dry sandbarrens west of Kankakee, Illinois, August 3, 1912 (Field); *idem 1781*, dry hill, Elgin, Illinois, August 27, 1912 (Field, 2 sheets); *H. C. Skeels 375*, Gougar's Prairie, Joliet, Illinois, July 14, 1904 (Field); *Ernest C. Smith 510*, roadsides, Hinsdale, Illinois, September 2, 1902 (Field); *G. W. Stevens 2713*, open woods in mountain valley near Page, Oklahoma, September 9, 1913 (Gray); *J. T. Stewart*, bluffs around Peoria, Illinois, 1867 (Field); *E. B. Uline*, Fish Lake, LaPorte County, Indiana, July, 1891 (Field); *idem*, Mishawaka, Indiana, July 1, 1891 (Field, 2 sheets); *L. M. Umbach*, prairies, Du Page, Illinois, July 6, 1898 (Berl.; Field; Gray).

87. **Coreopsis verticillata** L. Sp. Pl. 907. 1753. Chrysanthemum Marianum, etc. Pluk. Mant. *pl. 344, f. 4.* 1769. *Coreopsis tenuifolia* Ehrh. Beitr. 7: 168. 1792; Schkuhr Bot. Handb. edit. 2. *pl. 260b, fig. ad dextr.* 1808. *Coreopsis verticillata* var. *β tenuifolia* Michx. Fl. Bor. Amer. 2: 139. 1803. *Bidens verticillata* (L.) Baill. Hist. Pl. 8: 305. 1886.

Herba perennis, glabra, caulibus e basi plus minusve horizontali erectis, 5–9 dm. altis, subangulatis, superne ramosis. Folia opposita, sessilia, 3–6 cm. longa, laminis palmatim 3-partitis, segmentis 1–2-pinnatis, ultimis lineari-filiformibus, acriter apiculatis, 0.3–1 mm. latis. Capitula saepius pauca, saepe corymbosa, tenuissime pedunculata pedunculis glabris vel sparsissime pilosis, radiata, pansa ad anthesin 2.5–5 cm. lata et 6–9 mm. alta. Involucri bracteae exteriores circ. 8, oblongae vel oblongo-lineares, 4–6 (raro –9) mm. longae, subglabrae, apice saepius obtusae, quam interiores elliptico-oblongae minutissime pubescentes plerumque paulo breviores. Flores ligulati circ. 8, flavi, ligula elliptico-oblongi, apice integri vel minute denticulati, 1.2–2.5 cm. longi. Paleae lineares vel filiformes, superne latiores, apice acutae, ±4 mm. longae. Flores tubulosi flavi, pubescentes, stylorum ramis apice cuspidato-appendiculatis vel acriter conicis. Achaenia plana, oblongo-obovata, faciebus glabris subatra, marginibus anguste flavido-alata, apice exaristata vel (alis parce productis) vix bidentatis dentibus laceratis, omnino 3–5 mm. longa et 1–1.7 mm. lata.

Type specimen: No type cited by Linnaeus, although Virginia was given for the habitat. Linnaeus' first citation of literature is that of Gronovius, Virg. 105, whence the type would be understood to be a plant collected by *John Clayton* in Virginia (as then bounded) and perhaps still extant (Brit.).

Distribution: Maryland to Florida, Alabama, and Arkansas. Reported by some authors as extending to Kentucky and Nebraska. Probably not native farther north, although frequently cited for Ohio, Michigan, Canada, etc. (cf. Torr. & Gray, Fl. N. Amer. 2: 342. 1843; Gray, Syn. Fl. N. Amer. 1, pt. 2: 293. 1884). Occasionally escapes from gardens.

Specimens examined: *Anon. 576*, Arkansas, September, 1835 (Berl.); *anon.*, cult., June, 1818 (Berl.); *W. W. Ashe*, Chapel Hill, North Carolina, July, 1898 (Field); *M. S. Bebb*, District of Columbia, 1863 (Field; Gray); ex *Biltmore Herb. 437a*, open pine woods, Spartanburg, South Carolina, June 17, 1897 (Field; Gray); *Walter Blair*, dry ridges, Prince Edward County, Virginia, June, 1881

(Gray); *S. F. Blake 9542*, in colony, sandy field, Washington, District of Columbia, July 11, 1926 (Pom.); ex herb. *J. W. Blankinship*, Southern Pines, North Carolina, July 18, 1895 (Gray); *Buckley*, southeastern United States (Gray); *Agnes Chase 2382*, in woods, Riverdale, Maryland, June 22, 1904 (Field); *eadem 2474*, rocky woods, West Chevy Chase, Maryland, July 12, 1904 (Field); *A. H. Curtiss*, Virginia (Field); *idem*, Bedford County, Virginia, June 10, 1871 (Gray); *Earl Jerome Grimes 3768*, border of woods beside railway, vicinity of Williamsburg, Virginia, June 16, 1921 (Gray); ex herb. *D. Gronovii* (Berl.; cotype?); *James Hall*, Virginia, 1828–1834 (Field); *R. M. Harper 5*, alt. 345 meters, rocky bank of Town Creek on Sand Mountain, near Chavies, Alabama, November 24, 1905 (Gray; Mo.); *A. A. Heller 933*, about Suffolk, Virginia, June 8–13, 1893 (Field, 3 sheets; Gray); *Theodor Holm*, open thickets, Brookland, District of Columbia, June, 1894 (Gray); *Hort. Berol.*, cult., July 25, 1815 (Berl.); *idem*, cult., September, 1834 (Berl.); *idem*, cult., 1837 (Berl.); *H. D. House 150*, sandy woods, Takoma Park, District of Columbia, August 3, 1904 (Kew); *G. MacCarthy*, District of Columbia (Field); *E. L. Morris 105*, sandy roadsides along Potomac River, from Chain Bridge to opposite Cabin John Bridge, Virginia, July 1, 1899 (Field); *Thomas C. Porter*, 40 miles south of Lynchburg, Virginia, July 17, 1880 (Field); *L. F. & Fannie R. Randolph 150*, dry, sandy soil, sterile hillside field, vicinity of Lorton, Virginia, June 14, 1922 (Gray); *Arthur Schott*, near Georgetown, District of Columbia, August, 1857 (Field); *idem*, woods near Georgetown, June 22, 1860 (Field); *Earl E. Sherff 253*, cult., St. Louis, Missouri, July 6, 1910 (Field); *idem 5004*, cult., Harvard Univ. Bot. Gard., August 12, 1929 (Field); *John K. Small*, alt. 75 meters, on banks of Little Long Creek, Albemarle, North Carolina, August 22, 1894 (Field); *idem & A. A. Heller 372*, between Gold Hill and Falls of the Yadkin, Stanley County, North Carolina, August 18, 1891 (Field, 3 sheets); *E. S. Steele*, Washington, District of Columbia, August, 1889 (Pom., 2 sheets).

88. **Coreopsis pulchra** Boynt. in Small, Fl. S. E. United States 1277, 1340. 1903.

Herba perennis, erecta, glaberrima, 4–7 dm. alta, perspicue foliosa, caulibus moderate angulatis, plus minusve fastigiato-ramosis. Folia opposita, sessilia, principalia 2.5–4.5 cm. longa, palmatim circ. 3-partita foliolis mox subpalmatimque 2–3-partitis, segmentis ultimis anguste oblongeque linearibus, integris, 1-nervatis, membranaceis, eciliatis, apice obtusis, 2–4 cm. longis et 0.5–1.5 mm.

latis. Capitula numerosa, corymbosa, tenuiter pedunculata pedunculis saepius 4–10 mm. longis, radiata, pansa ad anthesin 3–5 cm. lata et circ. 9–11 mm. alta. Involucri bracteae exteriores 8–10, lineari-oblongae, superne saepe sensim vel subabrupte latiores, apice obtusae, glabrae, 5–8 mm. longae; interiores ovatae, apice pubescentes, plerumque tantum 4–6 mm. longae. Flores ligulati 6–8, intense flavi, ligula elliptico-oblongi vel anguste obovati, apice integri vel vix denticulati, 1.6–2.4 cm. longi. Paleae anguste lineares, apice saepius dilatatae, ±6 mm. longae. Flores tubulosi corollis purpureo-brunnei, stylorum ramis apice acriter conicis. Achaenia obcompressa, oblongo-obovata, anguste alata, apice corona humili laceratae ornata, circ. 4 mm. longa.

Type specimen: *Biltmore Herb.*, No. 14728 of the former Biltmore Herbarium. Specimen was collected in "northern Alabama," but doubtless was destroyed, along with many others, by the flood waters at Biltmore.

Distribution: In region of the Lookout Mountain, northeasternmost Alabama, and perhaps in adjacent Georgia.

Specimens examined: *T. G. Harbison*, cult., Highlands, North Carolina, August 1, 1905 (Gray, 2 sheets) and August, 1906 (Gray); *Charles Mohr*, Mentone, Alabama (N.Y., 2 sheets); *idem*, open, rocky woods, Mentone, near the Falls, Lookout Mountain, September 18, 1892 (U.S.); *idem*, damp rocks, DeSoto Falls, near Mentone, September 12, 1898 (U.S.); *Albert Ruth 612*, sandy soil, Lookout Mountain, DeKalb County, Alabama, July, 1898 (N.Y.); *idem 624*, near DeSoto Falls, Lookout Mountain, July, 1898 (U.S.).

89. **Coreopsis Delphinifolia** Lam. Encycl. 2: 108. 1786; Bot. Mag. *pl. 156*, sub nom. *C. verticillata*. 1791. Ceratocephalus Delphinii foliis Vaill. Hist. Acad. roy. sci. 1720: 328. 1722; Ehret Pl. et Pap. Rar. Depict. *pl. 9, f.* 1749. *C. verticillata* var. *linearis* Michx. Fl. Bor. Amer. 2: 138. 1803 (fide Torr. & Gray, Fl. N. Amer. 2: 342. 1843). *C. discolor* Link, Enum. Hort. Berol. 2: 353. 1822. *C. Delphiniifolia* Lam. ex Ind. Lond. 2: 294. 1930 (sphalm).

Foliorum segmenta magna ex parte 2–3.5 mm. lata.

C. Delphinifolia sensu stricto.

Foliorum segmenta magna ex parte 0.3–2 mm. lata. var. *β chlooidea.*

Herba perennis, caulibus erectis, gracilibus, tetragonis, glabris vel ad nodos hispidis, ad summam ramosis, 6–15 dm. altis, per totam longitudinem foliosis, internodiis folia vix aequantibus. Folia opposita, sessilia, suberecta vel parce patentia, 5–9 cm. longa, summa

saepe indivisa integraque, alia palmatim 3-partita, foliolo mediano plerumque rursus in 3–5 segmenta diviso, foliolis lateralibus simplicibus vel raro 2-partitis, segmentis ultimis linearibus membranaceis acutis glabris integris 1–6 (plerumque 2–3.5) mm. latis. Capitula corymbosa, tenuissime pedunculata pedunculis glabris 2–7 cm. longis, pansa ad anthesin 3–5 cm. lata et circ. 8–10 mm. alta. Involucri glabri bracteae exteriores 8–10, oblongo-lineares, obtusae, 4–6 mm. longae, quam interiores ovatae nunc vix longiores nunc vix breviores. Flores ligulati circ. 8, flavi, ligula anguste elliptico-oblongi, apice integri vel parce dentati, 1.3–2.5 cm. longi. Paleae filiformes, ad summam paulo dilatatae, achaenia superantes. Flores tubulosi corolla brunnei, stylorum ramis apice tenuiter caudatis. Achaenia obcompressa, circumambitu (alis brunneis 0.5–1 mm. latis inclusis) elliptico-oblonga vel obovata, 4.5–6 mm. longa et (alis inclusis) 2–4 mm. lata, glabra, corpore subnigra, apice minute 2-dentata dentibus fimbriatis.

Type specimen: The species was founded directly upon *Ceratocephalus Delphinifolius* Vaill. as illustrated by Ehret (loc. cit.) and supported by the material cultivated in the King's Garden at Paris. The native habitat was given as Virginia.

Distribution: Virginia to Georgia and Alabama.

Specimens examined: Liberty Hyde Bailey, cult., Ithaca, New York, July 24, 1935 (Field; sub nom. *C. microphylla*); ex *Biltmore Herb.*, sub num. *2064A*, rare in moist soil, Eastman, Georgia, June 4, 1900 (N.Y.); *A. H. Curtiss 6825*, low ground near Millen, Georgia, July 1, 1901 (Gray); herb. *Drs. A. C. Hexamer & F. W. Maier*, wet pine woods, Summerville, South Carolina, May 27, 1855 (Gray); *Hort. Berol.* (Berl.); *Hort. Cantabr.*, 1842 (Gray); *Hort. Lipsiae* (Berl.); *Hort. Paris.*, 1820 (Berl.); *Michaux*, North America (Berl.); *Earl E. Sherff 5003*, cult. in *Harvard Univ. Bot. Gard.* (*Hort. Cantabr.*), August 12, 1929 (Field); *John K. Small*, in and about the Altamaha River Swamp, Liberty County, Georgia, June 18–21, 1895 (Field); *J. T. Stewart*, near Charleston, South Carolina, June 1, 1865 (Field); *K. A. Taylor*, pine barren, Summerville, South Carolina, June 10, 1891 (Field).

Coreopsis Delphinifolia var. *β* **chlooidea** Sherff, Bot. Gaz. 94: 596. 1933.

E specie foliorum segmentis magna ex parte tantum 0.3–2 (nonnullis usque ad 3.2) mm. latis differt.

Type specimen: Collected by *Samuel Bottsford Buckley*, in pine woods, mountains of Alabama (Gray).

Distribution: Georgia and Alabama.

Specimens examined: *Buckley*, in pine woods, etc. (type, Gray); *Roland M. Harper 545*, dry pine barrens, Sumter County, Georgia, August 31, 1900 (Field).

90. **Coreopsis major** Walt. Fl. Carol. 214. 1788. *C. senifolia* Michx. Fl. Bor. Amer. 2: 138. 1803. *C. maior* Walt. ex Ind. Lond. 2: 295. 1930.

Folia simplicia.....var. ϵ *Oemleri.*

Folia principalia tripartita.

Foliola 1–3 (rarius –5) mm. lata.....var. δ *linearis.*

Foliola plerumque 5–25 mm. lata.

Foliola plerumque 5–11 mm. lata.....var. γ *rigida.*

Foliola latiora, plerumque 1–2.5 cm. lata.

Foliola plus minusve pubescentia.....*C. major* sensu stricto.

Foliola glabra.....var. β *stellata.*

Herba perennis, e basi horizontali erecta, gracilis, supra suberecte ramosa ramis tenuibus, 5–9 dm. alta, caule ramisque angulatis plus minusve pubescentibus. Folia opposita, sessilia, divaricata vel suberecta, summa simplicia integraque, alia tripartita, segmentis nunc subrhomboideo-ovalibus nunc elliptico-lanceolatis vel etiam lanceolatis (rarissime lineari-lanceolatis), membranaceis, integris, plus minusve pubescentibus, ciliatis, apice obtusis, terminali 4–7 cm. longo et 1.2–2.5 cm. lato, lateralibus plerumque paulo minoribus. Capitula subcorymbosa tenuiter pedunculata pedunculis glabris vel sparsim hispidis saepius 2–8 cm. longis, radiata, pansa ad anthesin 2.7–4 (–5) cm. lata et 7–9 mm. alta. Involucri plus minusve hispidi bracteae exteriores circ. 8, lineari-oblongae, superne saepe dilatatae, apice obtusae, 4–8 mm. longae, interiores ovato-oblongae vel lanceolato-ovatae subaequales. Flores ligulati circ. 8, flavi, ligula oblongo-lineares vel elliptico-oblongi, apice integri vel denticulati, 1.5–2.5 cm. longi. Paleae lineares, supra paulo dilatatae, achaenia multo superantia. Florum tubulosorum stylorum rami acriter conici. Achaenia valde obcompressa, elliptico-oblonga vel obovata, subnigra, glabrata, alata alis subbrunneis 0.2–0.7 mm. latis, omnino 4.5–6 mm. longa et 2–4 mm. lata, apice alis productis breviter bidentata vel plurisetosa.

Type specimen: No specimen cited. The remnants of Walter's collection, however, are in London (Brit.).

Distribution: South Carolina and Kentucky southwardly to Georgia and Mississippi.

Specimens examined: *C. F. Baker*, Blount Springs, Alabama, May 5, 1898 (Pom.); *S. B. Buckley*, Alabama, July, 1841 (Mo.); ex *Cambridge Bot. Gard.*, Cambridge, Massachusetts, August, 1845 (Berl.); *A. H. Curtiss 6471*, dry thickets near Stone Mountain, Georgia, June 12, 1899 (Gray); *John Davis 1855*, Stone Mountain, Georgia, June 18, 1921 (Gray; forma foliis glabratis); *A. Dedrick*, dry, sandy soils (Field); *F. S. Earle 2060*, Auburn, Alabama, May 28, 1899 (Field, 2 sheets); *idem 2061*, eodem loco, May 28, 1899 (Pom.); *idem & C. F. Baker*, eodem loco, August 17, 1897 (Pom.); *H. Eggert*, Sherwood, Tennessee, June 8, 1897 (Field); ex herb. *Hexamer et Maier*, along fences, Abbeville County, South Carolina, June, 1855 (Gray); *Miss Anna King 116*, dry border of woods, Mammoth Cave, Kentucky, July 2, 1916 (Field); *B. F. Leeds*, Chattanooga, Tennessee, September 29, 1892 (Field); *Dr. Mohr*, Mobile, Alabama (Field); *Philip A. Munz 1589*, dry, open woods, near Montgomery, Alabama, June 10, 1917 (Pom.); *Josephine Skehan 137*, Ocean Springs, Mississippi, June, 1892 (Gray; forma var. *stellatae* adpropinquans); *John K. Small*, alt. 300–420 meters, on northwest slope of Stone Mountain, Georgia, July 3, 1893 (Field); *John Donnell Smith*, grassy pine woods, Orangeburg District, South Carolina, August 9, 1884 (Field).

Coreopsis major var. *β* **stellata** (Nutt.) Robins. Rhodora 10: 68. 1908. *C. stellata* Nutt. Journ. Acad. Phila. 7: 76. 1834. *C. senifolia* var. *stellata* (Nutt.) Torr. & Gray, Fl. N. Amer. 2: 342. 1843.

Glabra, foliolis plerumque angustioribus, saepe longioribus, saepius rhomboide lineari-lanceolatis, terminali usque ad 1 dm. longo (rarissime monstroseque trifido vel tripartito).

Type specimen: No particular specimen cited.

Distribution: Virginia to southernmost Ohio and southwardly to Florida and Alabama.

Specimens examined: *Anon.* (*Mt. Desert Nurseries*), Bar Harbor, Maine, August, 1906 (Gray); *Samuel M. Bain 95* p.p., sandy hills, Henderson, Tennessee, July, 1893 (Gray); *H. C. Beardslee & C. A. Kofoid*, alt. 900 meters, sandy woods, Swain, North Carolina, August, 1891 (Gray); *Beyrich*, in thickets, Georgia (Berl.); ex *Biltmore Herb. 175a* and *b*, light soil in upland woods, North Carolina, July 7, 1897 (*175a*, Field; Gray: *175b*, Gray); *J. R. Churchill*, woods, Lookout Mountain, near Chattanooga, Tennessee, June 2, 1911

(Gray); *John Davis 2097*, dry, open woods, Tryon, North Carolina, June 29, 1920 (Gray); *idem 7818*, dry woods, near Anderson, South Carolina, August 30, 1917 (Mo.; forma var. *rigidae* adpropinquans); *A. H. Curtiss*, Bedford County, Virginia, July 1, 1868 (Field); *idem*, eodem loco, June 30, 1871 (Gray, 2 sheets; forma nonnullorum foliorum foliolis tripartitis); *idem*, eodem loco, July 3, 1872 (Field); *idem 1487*, alt. 600 meters, rocky woods. Chilhowee Mountains, Tennessee, June (Berl., 2 sheets; Field); *F. S. Earle & C. F. Baker*, Auburn, Alabama, May 28, 1898 (Field); *George Engelmann*, Norristown, eastern Tennessee, August 27, 1876 (Mo.); *Juliet Fauntleroy 654*, near Huddleston, Virginia, August 9, 1914 (Gray); *Gates*, Alabama (Gray); *Asa Gray & John Carey*, mountains of Virginia and North Carolina, July, 1841 (Gray; var. *rigidae* adpropinquans); *James Hall*, Montgomery County, Alabama, 1828–1834 (Field); *T. G. Harbison*, Waynesville, North Carolina, 1897 (Gray); *idem*, Highlands, North Carolina, 1905 (Gray); *Roland M. Harper 46*, alt. 205 meters, dry oak woods, Athens, Georgia, June 25, 1900 (Berl.; var. *rigidae* adpropinquans); *idem 131*, alt. 205 meters, eodem loco, July 3, 1900 (Gray); *A. Arthur Heller 99*, vicinity of Salisbury, North Carolina, June 21, 1890 (Field, 2 sheets); *idem 1013*, alt. 540 meters, near Hickory, North Carolina, June 23, 1893 (Field; var. *rigidae* adpropinquans); *Hooker*, Kentucky (Berl.); *Hortus Cantabr.*, cult., 1842 (Gray); *idem*, cult., 1873 (Gray); ex *Hort. Lipsiae* (Berl.); *Arthur H. Howell 808*, Anniston, Alabama, June 10, 1913 (U.S.); *F. W. Hunnewell, 2nd*, dry woods, White Sulphur Springs, West Virginia, July 4–6, 1914 (Gray); *T. H. Kearney, Jr.*, White Cliff Springs, Tennessee, July 14, 1894 (Field, 2 sheets); *B. F. Leeds*, Chattanooga, Tennessee, September 29, 1892 (Field, 2 sheets); *E. E. Magee*, Hayward County, North Carolina, September, 1897 (Gray); *idem*, Waynesville, North Carolina, September 9, 1897 (Gray); *idem*, alt. 750 meters, Highlands, North Carolina, September 2, 1902 (Gray); *idem*, eodem loco; below Satulah Mountain, August 2, 1902 (Gray); *E. L. Morris 1050*, alt. 620 meters, shaded river bank near Spanishburg, West Virginia, July 23, 1900 (Field); *Thomas C. Porter*, middle Georgia, 1846 (Gray); *L. F. & Fannie R. Randolph 1066*, dry, sterile soil, edge of woods, southeast of Granite Falls, North Carolina, July 30, 1922 (Gray, var. *rigidae* adpropinquans); *Riddell*, Kentucky (Gray); *Benjamin L. Robinson 79*, Asheville, North Carolina, August 2, 1893 (Berl.; Gray); *F. Rugel*, Florida, 1844 (Gray; Mo.); ex herb. *Margaret P. Russell*, Asheville, North Carolina (Gray); *Albert Ruth*, sandy woods, Knoxville, Tennessee, June, 1893 (Field); *idem*, gravelly soil and rocky places,

Mount Nebo, eastern Tennessee, July, 1893 (Mo., 2 sheets); *idem*, open woodlands, Knoxville, June, 1895 (Berl.); *idem*, woods, Lookout Mountain, Georgia, July 20, 1897 (Gray); *Earl E. Sherff 5007*, cult., Harvard Univ. Bot. Gard., August 12, 1929 (Berl.; Del.; Field); *W. L. Sherwood*, Waynesville, North Carolina, July, 1897 (Gray); *idem*, Tuckasiegee Valley, North Carolina, September 20, 1897 (Gray); *B. Shimek*, Monte Sano, Alabama, July, 1891 (Field); *C. W. Short*, hilly lands, Kentucky (Field); *Howard Shriver*, Wytheville, Virginia, July, 1877 (Berl.; Field); *John K. Small*, alt. 900 meters, on Round Top Mountain, west of Seven Mile Ford, Smyth County, Virginia, July 2, 1892 (Field; Gray); *idem*, alt. 660 meters, on Farmer Mountain, on New River, Carroll County, Virginia, July 12, 1892 (Field); *idem*, alt. 750 meters, Nick's Creek, base of Pine Glade Mountain, Smyth County, Virginia, August 5, 1892 (Field); *idem & A. Arthur Heller*, alt. 1,350 meters, Green's Hill, near Blowing Rock Mountain, Watauga County, North Carolina, July 10, 1891 (Field); *iidem*, between Cranberry and Linville, North Carolina, July 17, 1891 (Field); *iidem*, southern slopes of Grandfather Mountain, North Carolina, July 25, 1891 (Field); *iidem*, alt. 1,050 meters, Rocky Knob, near Blowing Rock Mountain, Caldwell County, North Carolina, July 24, 1891 (Field; Gray); *iidem 328*, Blowing Rock Mountain, Watauga County, North Carolina, July 29, 1891 (Field, 3 sheets); *iidem* (similiter) *328*, eastern slopes of Blowing Rock Mountain, Caldwell County, North Carolina, July 31, 1891 (Field, 3 sheets); *John Donnell Smith*, Warm Springs, Madison County, West Virginia, July 29, 1880 (Field); *idem*, Caesar's Head, South Carolina, July, 1881 (Field); *Roland Thaxter*, Cullowhee, North Carolina, June–July, 1887 (Gray); *S. M. Tracy 9049*, Warm Springs, Georgia, May 20, 1905 (Berl.; Field; Gray); *G. R. Vasey*, northern Alabama, 1878 (Field); *idem*, North Carolina, 1878 (Gray); *William C. Werner 92*, Ironton, Ohio, 1892 (Gray); *Karl M. Wiegand & W. E. Manning 3414*, sandy bank by roadside, 4 miles west of Raleigh, North Carolina, June 27, 1927 (Pom.); *iidem 3415*, edge of dry pine woods, 12 miles south of Asheboro, North Carolina, June 30, 1927 (Pom.); *Charles Wright*, northern Georgia (Gray).

Coreopsis major var. γ **rigida** (Nutt.) F. E. Boynton in Small, Fl. S. E. United States 1276, 1340. 1903. *C. senifolia* var. *rigida* Nutt. Gen. Amer. 2: 180. 1818. *C. Wrayi* Nutt. Journ. Acad. Phila. 7: 76. 1834. *C. senifolia* Hook. Bot. Mag. 63: *pl. 3484*. 1836 (non Michx.). *C. Delphinifolia* var. *rigida* (Nutt.) Torr. & Gray, Fl. N.

Amer. 2: 342. 1843. *C. rigida* Nutt. ex Torr. & Gray, loc. cit.; cf. Ind. Kew. 1: 617. 1895.

Folia rigidula, tripartita, plerumque suberecta, foliolis plerumque lineari-lanceolatis, faciebus saepissime glabris marginibus scabridis, saepius 3–7 cm. longis et 5–11 mm. latis.

Type specimen: No type cited, but habitat was given as Georgia.

Distribution: Virginia and Tennessee southwardly to Georgia.

Specimens examined: *Anon.*, ex Nutallio ipso, loc. ignoto (Gray, sub nom. *Coreopside Wrayi* Nutt.); *Harley Harris Bartlett 1638*, pine barren, vicinity of Thomson, Georgia, July 23, 1909 (Pom.); *William M. Canby*, Florence, South Carolina, July 3, 1878 (Field); *H. Eggert*, dry woods on Yellow River, Gwinne County, Georgia, July 27, 1897 (Mo.); *Roland M. Harper*, sunny, rocky hillside, vicinity of Sawdust, Georgia, June 18, 1927 (Gray; Mo.); *Hort. Cantabr.*, cult., 1849 (Gray); *C. G. Lloyd*, near Rockwood, Tennessee, August 10, 1880 (Field); *C. Mohr*, dry pine woods, Bladon (Bladen), Alabama, July, 1875 (Field); *H. W. Ravenel*, Santee Canal, South Carolina, July, 1846 (Gray); *Albert Ruth*, dry, sandy soil, Chilhowee Gap, Tennessee, July, 1893 (Mo.); *idem*, sandy soil, Knoxville, Tennessee, May, 1896 (Mo.); *H. Shriver*, Wytheville, Virginia, 1875 (Field); *John K Small & A. Arthur Heller*, north of Hickory, North Carolina, June 25–26, 1891 (Field); *Huron H. Smith 2526*, Blue Ridge Mountains, Fannin County, Georgia, July 26, 1909 (Field).

Coreopsis major var. δ **linearis** Small, Bull. Torr. Bot. Club 22: 48. 1895.

Parce inconspicueque pubescens, caule 3–6 dm. alta. Folia tripartita segmentis linearibus, 3–11 cm. longis et 1–3 (rarius –5) mm. latis utrinque acuminatis. Capitula etiam ligulae achaeniaque paulo minora.

Type specimen: Collected by *John Kunkel Small*, at altitude of 300–330 meters, on Little Stone Mountain, DeKalb County, Georgia, July 7, 1893 (N.Y., 2 sheets).

Distribution: South Carolina and Central Georgia.

Specimens examined: *J. K. Small*, Little Stone Mountain, etc. (type, N.Y., 2 sheets); *John Donnell Smith*, grassy pine woods, Orangeburg District, South Carolina, August 9, 1884 (Field; Gray).

Coreopsis major var. ϵ **Oemleri** (Ell.) Britton, Mem. Torr. Bot. Club 4: 131. 1894. *C. Oemleri* Ell. Sketch Bot. S. Carol. & Georgia 2: 435. 1824.

Var. *stellatae* similis sed foliis simplicibus differt.

Type specimen: Collected by *Oemler*, near the junction of the Broad and Saluda rivers, vicinity of Columbia, South Carolina.

Distribution: North Carolina to Georgia.

Specimens examined: None.

Asa Gray (Syn. Fl. N. Amer. 1, pt. 2: 294. 1884) treated this as "the abnormal entire-leaved form" of var. *stellata*. An examination of the specimens at Gray Herbarium shows no material of the "entire-leaved form," however, and it is probable that Gray was guided largely by the inscription on A. H. Curtiss's label for a sheet of normal var. *stellata* at Gray Herbarium. This has the observation, "with simple leaves not uncommon." Gray's treatment was followed essentially by Robinson and Fernald (Gray's New Manual, ed. 7. 838. 1908). It may be noted, too, that Boynton (in Small, Fl. S. E. United States 1276. 1903) made the var. *Oemleri* to include var. *stellata*. Boynton's complete omission of the entire-leaved plants from his description, however, may well lead to the suspicion that he had unintentionally overlooked them. Small (Bull. Torr. Bot. Club 22: 48. 1895) describes "a peculiar state" of *C. major* having "leaves undivided, there being two opposite and entire leaves at each node in place of the normal three-parted ones." Clearly, he referred to plants of var. *Oemleri*. He states further: "It seems to have been first collected by Dr. and Mrs. Britton at Black Mountain Station, North Carolina. Later Mr. Heller secured it near Salisbury, N.C., and last season (1893) I came upon it at the western base of Stone Mountain, Georgia." Apparently the variety is somewhat less distinct than the other varieties of *C. major* (even they, however, pass from one into another by various transitional forms; cf. A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 294. 1884), but seems to bear a relation to its parent species comparable to that of var. *Smithii* to *Coreopsis tripteris*.

91. **Coreopsis tripteris** L. Sp. Pl. 908. 1753; Hook. Bot. Mag. *pl. 3583*. 1837. *Anacis tripteris* (L.) Schrank in Münch. Math. et Nat. 5: 7 (fide DC. Prodr. 5: 568. 1836). *Chrysostemma tripteris* (L.) Less. Syn. Compos. 227. 1832 (fide DC. loc. cit). *Coreopsis tripteris* var. β Torr. & Gray, Fl. N. Amer. 2: 341. 1843. *Coreopsis tripteris* vars. *Deamii* et *intercedens* Standl. Rhodora 32: 34. 1930.

Folia divisa.

Foliorum segmenta subrhomboidea.....var. γ *subrhomboidea*.

Foliorum segmenta late elliptico-linearia vel anguste oblongo-lanceolata.....*C. tripteris* sensu stricto.

Folia simplicia.....var. β *Smithii*.

Herba perennis, e basi horizontali erecta, plerumque glabra rarius pubescens, plus minusve pallida, 1–3 m. alta, caulibus teretibus summam versus ramosis. Folia opposita, principalia petiolata petiolis 0.5–3 cm. longis, petiolo adjecto 6–12 cm. longa, 3-partita, foliolo mediano saepe rursus 3-partita, segmentis late elliptico-linearibus vel anguste oblongo-lanceolatis, apice acutis vel subobtusis, marginibus aegre revolutis, faciebus glabris vel rarius pubescentibus; folia summa minora, saepe simplicia et subsessilia. Capitula (contusa odorata) subcorymbosa, tenuiter pedunculata pedunculis saepius 3–8 cm. longis, radiata, pansa ad anthesin 3–5 cm. lata et 8–10 mm. alta. Involucri saepius glabri bracteae exteriores circ. 8, oblongo-lineares, obtusae, circ. 2–3 mm. longae, interiores oblongo-ovatae 4–6 mm. longae. Flores ligulati plerumque 7 vel 8, flavi, ligula plus minusve elliptico-oblongi, apice subintegri vel dentati, 1.2–2.4 cm. longi. Paleae filiformes, apicem versus dilatatae, striis purpureis percursae, 5–7 mm. longae. Flores tubulosi primo plus minusve flavi demum brunnei vel purpurei, stylorum ramis apice breviter caudato-appendiculatis. Achaenia brunneo-nigra, obcompressa, faciebus glabra, circumambitu (alis angustis subbrunneis inclusis) cuneato-oblonga vel cuneato-obovata, omnino 5–7 mm. longa et 2.8–4.2 mm. lata, apice emarginato setis minimis erectis munita.

Type specimen: No particular type was cited. The habitat was given as Virginia and the first cited reference was the *Coreopsis foliis subternatis integerrimis* of the Hort. Upsal. 269. Other citations were in the following order: *Rudbeckia foliis compositis integris*, Roy. lugdb. 181; *Chrysanthemum virginianum, folio acutiore laevi trifoliato f. anagyridis folio*, Moris. Hist. 3. p. 21. s. 6. *t. 3. f. 44;* Raj. Suppl. 215.

Distribution: Massachusetts, southern Ontario, and Wisconsin, southwardly to Georgia, Mississippi, western Louisiana, and eastern Kansas.

Specimens examined: *H. C. Beardslee & C. A. Kofoid*, alt. 600 meters, sandy banks, Great Smoky Mountains, Swain County, North Carolina, August, 1891 (Field; Gray); *M. S. Bebb*, Fountaindale, Illinois (Gray); *Florence Beckwith 54*, Dallas City, Illinois, September, 1917 (Field); *H. C. Benke 1841*, Elgin, Illinois, September 8, 1916 (Field); *Biltmore Herb. 173a*, moist grounds and bordering streams, Biltmore, North Carolina, August 1, 1897 (Gray; Pom.); *O. W. Blakley 3420*, open woods near Page, Oklahoma, August 27, 1914 (Mo.); *J. W. Blankinship*, Greene County, Missouri, September 7, 1888 (Gray); *Fred W. Brendel*, Peoria, Illinois (Field); *A. B. Burgess 433*, railroad bank, Flowerfield, Michigan, September 30,

1903 (Field); *idem 513*, shrubbery at roadside, Portage, Michigan, October 5, 1903 (Field); *W. W. Calkins 135*, prairie, Berwyn, Illinois (Field); *idem 145*, common, Berwyn, Illinois, August 26, 1907 (Field); *S. H. & D. R. Camp*, dry ground, Jackson County, Michigan, August 18, 1897 (Field); *iidem*, Jackson County, Michigan, August 18, 1898 (Field); *Agnes Chase*, open woods, Rogers Park, Illinois, August 27, 1896 (Field); *Virginius H. Chase*, dry prairie north of Wady Petra, Illinois, August 12, 1896 (Field); *J. R. Churchill*, shore of Lake Michigan, Indiana, September 4, 1893 (Pom.); *John Davis*, near LaGrange, Missouri, June 9, 1915 (Mo.); *C. C. Deam & H. A. Gleason*, dry upland woods, Bluffton, Indiana, September 1, 1904 (Gray); *Arthur DeSelm 499*, highways south of Tucker, Illinois, August 7, 1913 (Field); *idem 621*, highway near Kankakee, Illinois, September 7, 1913 (Field); *W. M. Dick*, Lorain County, Ohio, July 31, 1895 (Gray); *S. S. Dickey 96*, dry roadside, Warren County, Pennsylvania, August 25, 1923 (Gray); *Charles K. Dodge*, near Port Huron, Michigan, August 4, 1895 (Field); *C. W. Duesner*, Miller, Indiana, 1908 (Field); *F. S. Earle*, creek bottoms, Auburn, Alabama, September 4, 1899 (Field); *H. Eggert*, prairie and dry hills, St. Louis, Missouri, August 25, 1874 (Gray); *idem*, woods, St. Louis, Missouri, August 23, 1887 (Gray); *idem 122*, central United States, August 30, 1875 (Berl.); *James Galen 4289*, woods and thickets, eastern United States, 1883 (Gray); *Frank C. Gates 808*, Edgewater, Illinois, August 23, 1905 (Field); *idem 10104*, prairie, Carthage, Illinois, September 15, 1916 (Field); *H. A. Gleason*, in strip of original prairie, east of Rantoul, Illinois, October 5, 1907 (Gray); *idem 812*, prairie soil along roadsides, southwest of Dalton City, Illinois, August 22, 1899 (Gray); *idem 1813*, dry upland woods, Grand Tower, Illinois, August 28, 1900 (Gray); *idem 1977*, prairie, Illinois, September 4, 1900 (Gray); *idem 2753*, dry upland woods, Herod, Illinois, August 23, 1902 (Gray); *Grassly*, Miller, Indiana, August 31, 1880 (Field); *J. M. Greenman 544*, Tygart Junction, West Virginia, September 24, 1904 (Field; Gray); *idem 3991*, Webster Grove, Missouri, September, 1920 (Mo.); *Dr. Hale*, Louisiana (Gray); *Elihu Hall*, barrens, etc., Athens, Illinois, 1861 (Field; Pom.); *idem*, eodem loco, August, 1864–1867 (Field); *idem*, eodem loco, August, 1868 (Field); *Roland M. Harper 1954*, alt. 50 meters, bank of Flint River, near Albany, Georgia, August 27, 1903 (Berl.; Field; Gray); *A. A. Heller*, vicinity of Salisbury, North Carolina, August 21, 1890 (Field); *idem*, near mouth of Tucquan Creek, Lancaster, Pennsylvania, September 1, 1890 (Gray); *idem & E.*

Gertrude Halbach, near McCall's Ferry, Pennsylvania, September 9, 1893 (Field); *A. A. & E. G. Heller 4129*, alt. 90 meters, near Texarkana, Arkansas, August 23, 1898 (Field; Gray); *Albert S. Hitchcock*, wet ground, Iowa City, Iowa, 1888 (Calif.); *Hort. Berolinensis*, cult., September 11, 1876 (Berl.); ex *Hort. Goetting.* (Berl.); *Hort. Lipsiae*, cult. (Berl.); *Hort. Bot. de l'Ecole de Médecine de Paris*, August, 1820 (Berl.); *J. W. Huett*, Ottawa, Illinois (Gray); *T. H. Kearney, Jr. 553*, Clear Creek, Bell County, Kentucky, September, 1893 (Field; Gray; Pom.; etiam in Field qua varietati *Smithii* adpropinquans); *Miss Anna King 534*, dry banks or in prairie land, Glenwood, Illinois, September 20, 1918 (Field); *eadem 566*, dry soil in thickets of waste field, eodem loco, September 20, 1918 (Field); *W. Krebs*, Cleveland, Ohio (Berl.); *O. E. Lansing, Jr. 428*, open woods, Chicago, Illinois, August 14, 1898 (Field); *idem 647*, prairie land, West Pullman, Illinois, July 27, 1899 (Field); *idem 1646*, sandy woods near dunes, near Porter, Indiana, September 16, 1902 (Field); *idem 2832*, border of oak woods, Gibson, Indiana, August 13, 1910 (Field; Gray); *idem 3822*, sandy roadsides, Starved Rock, Illinois, September 7–8, 1914 (Field); *idem 3911*, open, sandy woods, Pine, Indiana, August 22, 1915 (Field); *Ray N. Lloyd*, Ravenswood, Illinois, August 31, 1887 (Field); *John Macoun*, thickets, Sandwich, Ontario, August 4, 1892 (Gray); *F. E. McDonald*, open, dry woods, Peoria, Illinois, August, 1900 (Field); *idem*, eodem loco, September, 1901 (Field); *idem*, frequent in rich woods, eodem loco, August, 1904 (Gray); *Michaux*, North America (Berl.); *Charles F. Millspaugh 3865*, railroad ditch, Lakeside, Berrien County, Michigan, September, 1914 (Field); *W. S. Moffatt 492*, thickets, Pine, Indiana, August 31, 1895 (Field; Gray); *Albert Hanford Moore 2552* and *2553*, sandy east bank of Tygart's Valley River, near Tygart Junction, West Virginia, September 24, 1904 (Gray); *E. L. Moseley*, Oxford, Ohio, August 21, 1895 (Field); *L. H. Pammel 621*, Ames, Iowa, September 10, 1897 (Gray); *H. N. Patterson*, dry bluffs, Henderson County, Illinois, August, 1871 (Field); *Donald C. Peattie 164*, sandy fields, Tremont, Indiana, August 13, 1920 (Field); *idem 2029*, Griffith, Indiana, August 15, 1925 (Field); *Thomas C. Porter*, banks and islands of Susquehanna River, Lancaster County, Pennsylvania, August 22, 1861 (Gray); *Miss Carrie A. Reynolds*, Stony Island, Illinois, August 24, 1909 (Field); *Riddell*, Ohio (Gray); *Robert Ridgway 60*, Olney, Illinois, September 7, 1917 (Field); *Benjamin L. Robinson*, rich prairie soil, Hendrix, Illinois, August 31, 1904 (Gray); *idem 56*, Bloomington, Illinois, September, 1893 (Berl.);

F. Rugel, in valley of Blue Ridge Mountains, North Carolina, August, 1841 (Berl.); *Albert Ruth 69*, woods, Lookout Mountain, Georgia, July 19, 1897 (Gray); *H. P. Sartwell*, Maumee River, Ohio (Field); *Earl E. Sherff 1038*, near Jefferson Barracks, Missouri, August 11, 1910 (Field); *John K. Small*, north of Marysville, Pennsylvania, August 15, 1888 (Field); *idem*, vicinity of mouth of Tucquan Creek, Lancaster County, Pennsylvania, September 1, 1890 (Field); *idem*, eodem loco, October 11, 1890 (Field); *idem*, alt. 480 meters, in canyon at Tallulah Falls, Rabun County, Georgia, August 4, 1893 (Field); *idem*, alt. 900 meters, about Estatoah Falls on Mud Creek, Rabun County, Georgia, August 12, 1893 (Field); *idem & A. A. Heller 100*, vicinity of Faith Post Office, North Carolina, August 14, 1891 (Field); *Frank Thone 232*, Starved Rock, Illinois, May–September, 1921 (Field); *S. M. Tracy 8670*, Taylorville, Mississippi, August 20, 1903 (Field; Gray); *L. M. Umbach*, woods, Clarke, Indiana, August 28, 1897 (Field); *idem*, eodem loco, August 20, 1898 (Field); *G. R. Vasey*, Lookout Mountain, Tennessee, 1878 (Field); *L. F. Ward*, Potomac flats, Maryland, August 12, 1877 (Field); *Roscoe J. Webb*, dry soil, Pippin Lake, Portage County, Ohio, September 6, 1909 (Gray); *E. F. Williams*, vacant lots, Boston, Massachusetts, September 3, 1903 (Gray); *Wilbur H. Wright 221*, Chicago, Illinois, August 22, 1908 (Field).

A tall species of attractive appearance and wide distribution over the eastern and central United States. Commonly glabrous, but at times becoming more or less pubescent. Torrey and Gray (Fl. N. Amer. 2: 341. 1843) designated a pubescent form ("leaves minutely scabrous-puberulent. . . . Western Louisiana, Dr. Veatch") as "var. β." During the four decades following, however, Asa Gray had many opportunities to see the inconstancy of the pubescence character in *C. tripteris*. Hence, in his *Synoptical Flora of North America* (1, pt. 2: 294. 1884) he modified the description of *C. tripteris* from "smooth and glabrous" to read "smooth and glabrous, or leaves minutely pubescent." Some years ago I myself, in a purely tentative way, treated the pubescent extremes as constituting a variety, which variety was set off with a proper name in my manuscript. With the examination of hundreds of herbarium and field specimens, however, it became apparent that the pubescence character was too capricious to admit of utilization, and that Gray's reduction of a variety thus segregated, to synonymy, would needs be accepted. Recently Standley (loc. cit.), apparently overlooking the treatments by Torrey and Gray and by Gray, has

described the var. *Deamii* to include forms with leaves pubescent at least underneath and involucres hairy; also the var. *intercedens* to include forms with leaves pubescent at least underneath and involucres glabrous.

Coreopsis tripteris var. β **Smithii** Sherff, Bot. Gaz. 88: 301. 1929.

E specie foliis omnibus vel fere omnibus integris, lamina tenuiter oblongo-lanceolata differt.

Type specimen: Collected by *John Donnell Smith* in low, open woods near Montgomery, Alabama, August 26, 1885 (Field).

Distribution: Kentucky and Arkansas, southwardly to Florida, Georgia, and Mississippi.

Specimens examined: Ex herb. *A. W. Chapman*, Georgia (Mo.); *T. H. Kearney, Jr.*, along Clear Creek, Bell County, Kentucky, September, 1893 (Field); *George V. Nash 2585*, River Junction, Gadsden County, Florida, September 5, 1895 (U.S.); *E. J. Palmer 8468*, moist, open ground, Malvern, Arkansas, September 4, 1915 (Mo.); *Charles Louis Pollard 1222*, Waynesboro, Mississippi, August 8–9, 1896 (Field); *John Donnell Smith*, low, open woods, etc. (type, Field; cotypes, Gray; Mo.).

According to Smith's additional note on the type sheet, Asa Gray had pronounced this plant a new variety of *Coreopsis tripteris* and, in a letter written in November, 1885, had given it a varietal name. While Gray would probably have published the name had he not died shortly afterward, his proposed name was passed over by me in accordance with the recommendations of the Vienna Rules (Recomm. XIV. *e*) and the variety named in honor of the type collector.

Coreopsis tripteris var. γ **subrhomboidea** Sherff, Bot. Gaz. 88: 303. 1929.

Folia tripartita foliolis lateralibus lanceolatis terminali rhomboideo-lanceolato 1.7–2.3 cm. lato, petiolo adjecto 6–8 cm. longa. Capitula minora, achaeniis tantum 4–4.5 mm. longis.

Type specimen: Collected by *Ernest Jesse Palmer*, No. 29421, sandy, open woods bordering bog, near Texarkana, Bowie County, Texas, October 27, 1925 (Gray).

Distribution: Known only from type locality in Bowie County, Texas.

Specimens examined: *Palmer 29421* (type, Gray).

In the more than two hundred collections of the species proper studied by me, all the leaflets were variously linear, oblong-linear, or narrowly oblong-lanceolate, and the achenes were commonly 5–6 mm. long. In the Palmer plant the terminal leaflets approach very distinctly a rhombus in outline and the achenes are smaller, measuring only about 4–4.5 mm. in length.

92. **Coreopsis latifolia** Michx. Fl. Bor. Amer. 2: 137. 1803. *Leiodon latifolium* (Michx.) Shuttl. Distrib. Rugelii Pl., Herb. Berol., etc.

Herba perennis, erecta, gracilis, glabra vel pubescens, 1–1.5 m. alta, summam versus erecte ramosa, foliosa usque vel fere usque ad summam. Folia opposita, subsessilia vel brevi-petiolata, omnino plerumque 1–2.3 dm. longa et 4–10 cm. lata, valde membranacea, ovata vel ovalia, basi late cuneata apice graciliter acuminata, margine ciliata ac serrata dentibus mucronatis. Capitula pauca vel numerosa, paniculato-corymbosa, tenuiter pedicellata pedicellis 2–10 cm. longis, radiata, pansa ad anthesin ±4 cm. lata et ±1.2 cm. alta. Involucri bracteae exteriores 6–9, perspicue herbaceae, lineari-oblongae, apice obtusae, patentes, 6–8 mm. longae; interiores oblongae, apicem versus abrupte angustatae, paulo longiores. Flores ligulati 4 vel 5, flavidi, ligula elliptico-oblongi, apice integri vel paululum dentati, circ. 1.5–1.8 cm. longi. Paleae lineares, obtusae, ±8 mm. longae. Flores tubulosi pauci (circ. 12), flavidi vel demum parce brunnei, stylorum ramis ad apicem conicis. Achaenia obcompressa, oblongo-lanceolata, exalata, apice angusto truncata ac calva, circ. 7 mm. longa.

Type specimen: Collected by *André Michaux* at higher altitude in the Carolina Mountains (Par.).

Distribution: North Carolina southward to Georgia.

Specimens examined: *Anon.*, mountains of North Carolina, September, 1843 (Gray); *Biltmore Herb. 5374b*, slopes of Craggy Mountain, Buncombe County, North Carolina, August 12, 1897 (Gray; N.Y.); *Buckley*, mountains of Carolina (Gray) and Georgia (N.Y.); herb. *A. W. Chapman*, mountains of Georgia (N.Y.); *Asa Gray*, Hickory Nut Gap, southeastern United States, 1843 (N.Y.); *idem & W. S. Sullivant*, mountains of Carolina, 1843 (Gray); *Harvard Univ. Bot. Gard.*, cult. anno 1849 e sem. e plantis in montibus Carolinae lectis (Gray); *Hort. Berol.*, cult. (Berl.); *F. Rugel*, on summits of mountains, Broad River, North Carolina, July, 1841 (Berl.; N.Y.; appellata *Leiodon latifolium* Shuttl.).

93. **Coreopsis tinctoria** Nutt., Journ. Acad. Phila. 2: 114. 1821. *Calliopsis bicolor* Reichenb. Mag. Aesthet. Bot. *pl. 70.* 1823. *Diplosastera tinctoria* (Nutt.) Tausch, Hort. Canalius fasc. 1, icon. et descript. 1823. *Calliopsis tinctoria* (Nutt.) DC. Prodr. 5: 568. 1836. *Coreopsis tinctoria* var. *β atropurpurea* Hook. Bot. Mag. *pl. 3511.* 1836. *Coreopsis elegans* Hort. fide Sieb. & Voss, Vilmor. Blumeng. ed. 3. 1. 487. 1894.

Among the numerous illustrations of this widely cultivated species we may cite the following: Bart. Fl. Amer. Sept. *pl. 45.* 1822; J. Radius, Schrift. Naturforsch. Gesellsch. Leipz. 1: *pl. 4.* 1822; Bot. Mag. *pl. 2512.* 1824; Bot. Reg. *pl. 846.* 1824; Sweet, Brit. Flow. Gard. 1: *pl. 72.* 1824.

Capitula pansa ad anthesin 2–3 cm. lata, achaeniis 1.2–4 mm. longis. *C tinctoria* sensu stricto.

Capitula pansa ad anthesin 1–1.5 cm. lata, achaeniis 0.9–1.4 mm. longis.....var. *β imminuta.*

Herba annua, erecta, glabra, 6–12 dm. alta, caulibus subtetragonis vel subteretibus, foliosis, multo ramosis ramis plus minusve angulatis. Folia opposita, subsessilia vel breviter petiolata, saepius 5–10 cm. longa, 1–2-pinnata vel summa indivisa, segmentis (vel laminis) anguste linearibus vel lineari-lanceolatis. Capitula numerosa, subcorymbosa, tenuiter pedunculata pedunculis (pedicellis) plerumque 4–10 cm. longis, radiata, pansa ad anthesin 2–3 cm. lata et 4–6 mm. alta. Involucri glabri bracteae exteriores circ. 8, plus minusve biseriales atque inter se imbricatae, lineari-oblongae vel saepius triangulatae, lateribus plerumque scariosae, ±2 mm. longae; interiores deltoideo-ovatae vel oblongo-ovatae, circ. 5–6 mm. longae. Flores ligulati circ. 7 vel 8, inferne brunneo-rubri, alibi flavi, ligula obovati, apice plerumque 3-lobati, 0.7–1.5 cm. longi. Paleae subfiliformes, superne coloratae atque angustatae, apice acutae, demum circ. 4–4.5 mm. longae. Flores tubulosi atro-rubri, stylorum ramis apice obtusis. Achaenia lineari-oblonga vel deorsum paulo angustata, valde obcompressa, glabra vel glabrata, exalata, nigra, apice calva, nunc vix 1.2 nunc etiam 3–4 mm. longa.

Type specimen: Collected by *Thomas Nuttall,* in flooded meadows on banks of Red River, Arkansas. Should be in London (Brit. or Kew). I have seen an authentic, fully labeled cotype (Berl.).

Distribution: Minnesota, Saskatchewan, and Washington southwardly to Louisiana, Texas, and California; cultivated everywhere for ornament and escaping frequently. Apparently becoming established at various places in China.

Specimens examined: *Anon. 575*, Fort Gibson, Arkansas, June, 1835 (Berl.); *Carrie Barker 31*, low ground, Tonkawa, Oklahoma, June 27, 1908 (Field); *J. M. Bates 2958*, Red Cloud, Nebraska, July 20, 1903 (Gray); *Robert Bebb 1174*, sandy soil, Galveston, Texas, May 18, 1903 (Field); *H. C. Benke 327*, Hutchinson, Kansas, October 5, 1918 (Field); *idem 4306*, Claflin, Kansas, June 22, 1926 (Field); *idem 4657*, Murphysboro, Illinois, July 6, 1928 (Field); *Katharine Brandegee*, Redstone Park, California, July 25, 1905 (Calif.); *N. L. Britton*, Norfolk, Virginia, June 10, 1892 (Field); *B. F. Bush 159*, Sheffield, Missouri, June 27, 1895 (Berl.); *idem 3017*, introduced, Sugar Creek, Missouri, June 22, 1905 (Gray): *George D. Butler 14*, sulphate flats, fields, and roadsides, north of Limestone Gap, Oklahoma, June 18, 1877 (Field); *William M. Canby 157*, plains of Manitoba, Canada, August 7, 1897 (Gray); *Harley P. Chandler 7010*, Rio Hondo, Texas, July, 1913 (Berl.; Gray); *H. C. Cheo & W. F. Wilson 11* p.p., Mo Kan Shan, Province of Chekiang, China, June 19, 1926 (Gray); *iidem 29*, cult., eodem loco, June 28, 1926 (Calif., 2 sheets; Gray); *Mr. & Mrs. J. Clemens 978*, Leon Springs, Texas, May 29, 1911 (Pom.); *Fred Clements 2778*, Spencer, Nebraska, July 25, 1893 (Gray); *Royal A. Dixon 17*, Huntsville, Texas, June 3–12, 1908 (Field); *R. R. Dreisbach 1042*, escaped, ash dumps, Olney, Pennsylvania, July 15, 1922 (Field); *Drummond*, Texas (Gray); *George Engelmann*, cult., St. Louis, Missouri, September, 1850, e sem. neo-mexicanis a Fendlero ad Santam Fe. lectis (Mo.); *Henry Engelmann* (*Captain Simpson's Expedition*), Fort Laramie, July, 1858 (Mo.); *B. W. Everman*, Lake Pend d'Oreille, Idaho, August 7, 1893 (Field); *August Fendler 397* pro parte, prairie hollows near Pawnee Fork, New Mexico, September, 1847 (Mo.); *Emily F. Fletcher*, Westford, Massachusetts (Gray); *Dr. Hale*, Louisiana (Gray); *Elihu Hall 344* pro parte, wet places, Hempstead, Texas, May 28, 1872 (Pom., 3 sheets); *idem 345*, eodem loco, June 3, 1872 (Field); *F. L. Harvey*, bluffs, Little Rock, Arkansas (Mo.); *Heiland*, cult., Lychen, Province of Brandenburg, Germany, August 16, 1882 (U.S.); *A. Arthur Heller 11752*, along railroad south of Redding, California, August 30, 1914 (Field; Gray); *Albert S. Hitchcock 279* and *666*, buffalo wallows, Pawnee County, Kansas, August 19, 1895 (Gray); *idem 13943*, savanna, Schofield Barracks, Leilihua, Island of Oahu, Hawaiian Islands, July 5, 1916 (U.S.); *Hooker*, Arkansas (Berl.); *Hort. Paris.*, 1823 (Berl.); *Marcus E. Jones 29474*, north of Corpus Christi, Texas, March 30, 1932 (Pom.); *W. W. Jones 227*, Middle Verde, Arizona, July 12, 1922 (Gray); *J. B. Leiberg*, moist places, Kootenai County, Idaho, June, 1890

(Field); *idem*, shores of Lake Pend d'Oreille, Idaho, July, 1892 (Field); *F. Lindheimer 102* p.p., prairies, Galveston Island, Texas, 1843 (Berl.; Gray); *idem 548*, rocky places, New Braunfels, Texas, May, 1851 (Berl., 2 sheets); *idem 897*, Texas, May, 1851 (Berl., forma multis achaeniis tuberculatis); *John Macoun*, Winnifred, Assiniboia, August 12, 1895 (Gray); *idem 38*, Red Deer Lakes, Canada, July 22, 1879 (Gray); *F. E. McDonald*, along roadsides near East Peoria, Illinois, July, 1919 (Field); *Albert Hanford Moore 1832*, escaped, in dump by Lake Anthony, Cottage City, Massachusetts, July 16, 1904 (Gray); *Nealley*, Chenates, western Texas, 1889 (Field); *J. C. Nelson 1802*, waste ground, Salem, Oregon, July 30, 1917 (Gray); *J. B. Norton 1455*, cult., alt. 300–900 meters, Kuliang Hills, near Foochow, Province of Fukien, China, July–August, 1919 (U.S.); *Thomas Nuttall*, flooded meadows, etc. (cotype, Berl.); *E. J. Palmer*, cherty barrens, Newton County, Missouri, July 15, 1906 (Gray); *idem 2272*, cherty barrens, Joplin, Missouri, June 19, 1909 (Gray); *J. C. Parlin*, North Berwick, Maine, July 4, 1892 (Gray); *Dr. Pitcher*, Arkansas (Gray); *Birdie T. Powell*, Hastings, Nebraska, July, 1886 (Field); *J. T. Rothrock*, cult., Philadelphia, Pennsylvania, June 25, 1877 (Field); *idem 317*, alt. 1,500 meters, Arizona, July, 1874 (Field; Gray); *T. E. Savage, J. E. Cameron, & F. E. Lenocker*, Spokane, Washington, July, 1898 (Field); *iidem*, The Dalles, Oregon, August, 1898 (Field); *A. K. Schindler 335*, alt. 1,100 meters, Lu-shan, Kuling Mountains, Kiangsi, China, July–August, 1908 (Berl.); *J. H. Schuette*, cult., Green Bay, Wisconsin, September 14, 1888 and August 23, 1897 (Field); *idem*, cult., eodem loco, July 31, 1901 (Gray); *idem*, cult., eodem loco, August 2, 1901 (Field; forma); *E. P. Sheldon*, Pike Island, Minnesota, July, 1895 (Pom.); *Sherff 250* pro parte, cult., St. Louis, Missouri, July 6, 1910 (Field); *idem 499*, cult., eodem loco, July 16, 1910 (Field); *idem 507*, cult., eodem loco et tempore (Field; Gray); *idem 5000*, cult., Chicago, Illinois, July 3, 1929 (Berl.; Calif.; Field; ligulis supra brunneo-rubris infra plus minusve flavis); *idem 5000a*, eodem loco et tempore (Berl.; Brit.; Calif.; Field; Kew; Mun.); *B. Shimek*, Oklahoma City, Oklahoma, July, 1892 (Field); *G. W. Stevens 784*, waste place along roadside, Cleo, Oklahoma, June 8, 1913 (Gray); *idem 1212*, waste place, Mountain Park, Oklahoma, June 23, 1913 (Gray); *A. N. Steward 1510*, Kikungshan, Province of Honan, China, July 23, 1925 (Calif.); *Tang Chung Chang & Nong Sing Po 3790*, campus of Fukien Christian University, Foochow, Province of Fukien, China, June 8, 1926 (Calif.); *W. F. Thurrow*, Hockley, Texas, 1890 (Field); *To Kang Peng, Ts'ang Wai Tak, & Ts'ang Un Kin 936* (*Canton Christian*

College No. 12935), Shiu-chau, Province of Kwangtung, China, July 18, 1924 (Calif.); *S. M. Tracy 7902*, Weatherford, Texas, May 26, 1902 (Berl.; Field; Gray); *L. M. Umbach 2752*, waste ground, Clyde, Illinois, July 14, 1900 (Gray); *Van Hermann 2686*, cult., vicinity of Santiago de las Vegas, Province of Havana, Cuba, May 16, 1905 (Calif.; Field; Gray); *L. F. Ward*, Ford County, Kansas, October 5, 1897 (Gray); *Mark White 218*, Summer County, Kansas, June 17, 1899 (Mo.); *Charles Wright 339* and *341*, western Texas, May–October, 1849 (Gray); *Cyril Zeller*, Ellis County, Kansas, 1908–1911 (Mo.).

A species often confused with *C. basalis* var. *Wrightii* and with *C. Atkinsoniana*. From both it is at once distinguished by its almost oblong, entirely wingless achenes. In cultivation, plants occur with the rays reddish-brown or brownish-red almost or quite throughout. These are the var. *atropurpurea* of Hooker. At times their rays are distinctly yellow on the under surface and brownish-red above.

Coreopsis bicolor Bosse ex Buchenau (Linnaea 25: 630. 1853, nomen) doubtless belongs with *C. tinctoria*.

Coreopsis tinctoria var. *β* **imminuta** Sherff, Bot. Gaz. 94: 594. 1933.

Capitula pansa ad anthesin 1–1.5 cm. lata, bracteis exterioribus ±1 mm. interioribus circ. 5–6 mm. longis, achaeniis 0.9–1.4 mm. longis.

Type specimen: Collected by *John Michael Holzinger*, Santa Fe, New Mexico, August 13, 1911 (Mo.).

Distribution: Known only from type locality of Santa Fe, New Mexico.

Specimens examined: *J. M. Holzinger*, Santa Fe, New Mexico (type, Mo.).

94. **Coreopsis basalis** (Dietr.) Blake, Proc. Amer. Acad. 51: 525. 1916. *Calliopsis basalis* Dietr. in Otto & Dietr. Allgem. Gartenzeit. 3: 329. 1835. *Coreopsis diversifolia* Hook. Bot. Mag. *pl. 3474*. 1836 (nec alior.). *Calliopsis Drummondii* D. Don in Sweet, Brit. Fl. Gard. ser. 2. 4: *pl. 315*. 1838. *Coreopsis Drummondii* (D. Don) Torr. & Gray, Fl. N. Amer. 2: 345. 1843. *Coreopsis Drummondii* var. *β* Torr. & Gray, loc. cit. *Coreopsis picta* Hort. fide Sieb. & Voss, Vilmor. Blumeng. ed. 3. 1: 487. 1894.

Foliorum segmenta linearia vel vix lanceolato-linearia.

var. *β Wrightii*.

Foliorum segmenta nunc lineari-lanceolata nunc elliptico-oblonga vel quidem orbiculata.....*C. basalis* sensu stricto.

Herba annua, erecta, ramosa, nunc fere glabra nunc pilis pluriarticulatis valde hispida vel tomentosa, 2–4 dm. alta, caulibus ramisque angulatis ac sulcatis. Folia opposita, petiolata petiolis 1–5 cm. longis, petiolo adjecto usque ad 12 cm. longa, principalia 1–3-pinnata segmentis lineari-lanceolatis vel elliptico-oblongis vel quidem orbiculatis, membranaceis, undulato-integris, apice obtusis vel raro acutis. Capitula ramos (terminaliter per 5–15 cm. plerumque nudos) terminantia, radiata, pansa ad anthesin 3–4.5 cm. lata et ±8 mm. alta. Involucri bracteae exteriores 8–10, saepe patentes, subulatae vel lineari-lanceolatae, apice plerumque acutae, marginibus plus minusve hispido-ciliatae, tergo longitudinaliter plerumque 3-vittatae, 5–9 mm. longae, quam interiores ovatae glabrae paulo breviores. Flores ligulati circ. 8, magna ex parte flavi sed ad basim brunneo-rubri, ligula cuneate ac late obovati, 1.3–2.3 cm. longi, apice 3-lobati lobo mediano rursus 2- (raro 3-) lobulato. Paleae angustissime lineares, demum contortae et bracteas interiores subaequantes. Flores tubulosi saltem superne atro-rubri, stylorum ramis apice obtuso-conicis. Achaenia obovata, tergo convexo nigra ac valde papillata, marginibus incurvatis incrassata cartilagineaque, 1.4–1.8 (–2) mm. longa, apice calva.

Type specimen: Cultivated in Berlin Botanical Garden from seed said to have come from Missouri. If "Missouri" is correct, then the plants there must have been likewise in cultivation, since the species is known in the spontaneous state only in Texas.

Distribution: Native to Texas. Sometimes cultivated for ornament and hence occasionally found elsewhere as an escape.

Specimens examined: *E. R. Bogusch 994*, Gonzales County, Texas, June 6, 1926 (Pom.); *Mrs. Charles C. Deam 1864*, near Lake Helen, Florida, April 26, 1906 (Gray); *T. Drummond 69* (commun. Hooker anno 1835), Rio Brassos (Brazos River), Texas (Gray); *idem 200* (commun. Hooker anno 1835), Texas (Gray); *E. H. Eames 8839*, waste ground, Fairfield, Connecticut, August 6, 1914 (Gray); *Elihu Hall*, Hempstead, Texas, June, 1872 (Field); *idem 343*, sandy prairie, eodem loco, May 2, 1872 (Field; Gray; Mo.; N.Y.; Pom., 2 sheets); *Harvard Univ. Bot. Gard.*, cult., 1844 (Gray); *Hort. Berol.*, July, 1837 (Berl., 2 sheets); *J. F. Joor*, open hills on Galveston Bay, Texas, June (Mo.); *John H. Kellogg*, cult. in Missouri Bot. Gard., June 30, 1905 (Mo.); *F. Lindheimer*, Galveston Island, Texas, November, 1842 (Mo.); *idem*, Texas, 1849 (Mo.); *idem 54*, Mill

Creek, Texas, April–May, 1844 (Mo.); *idem 101*, on dunes, Galveston Island, May, 1843 (Calif.; Field; Gray; Mo., 3 sheets; N.Y.); *B. Mackensen 76*, San Antonio, Texas, May 10, 1911 (Field); *Mänz 29*, Victoria, Texas (Berl.); ex herb. *C. Mohr*, damp meadows near coast, eastern shore of Mobile Bay, Alabama, April, 1868 (Field); *E. J. Palmer 7740*, nearly pure sand, Liberty, Texas, May 22, 1915 (Mo.); *J. Reverchon*, White Creek, Brazos, Texas, July 4 (Berl.); *J. Schneck*, La Grange, Texas, May, 1894 (Field); *J. H. Schuette*, cult., Green Bay, Wisconsin, September 14, 1888 (Field); *Earl E. Sherff 498*, cult., St. Louis, Missouri, July 16, 1910 (Field); *idem 5015*, cult., Harvard Univ. Bot. Gard., August 12, 1929 (Berl.; Brit.; Calif.; Field; Kew; Mun.); *idem 5018*, eodem loco et tempore (Field; Del.; Mo.; Mus.V.; U.S.); *W. F. Thurrow*, Hockley, Texas, 1890 (Field); *S. M. Tracy 8550*, Cameron, Louisiana, July 6, 1903 (Field; Gray; Mo.); *idem 8925* p.p., Victoria, Texas, April 27, 1905 (Berl.; Field; Gray; N.Y.); *S. R. Warner*, Willis, Texas, June 1 (Mo.); *Charles Wright*, Texas (Gray).

Coreopsis basalis var. *β* **Wrightii** (A. Gray) Blake, Proc. Amer. Acad. 51: 526. 1916. *C. Drummondii* var. *Wrightii* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 291. 1884; cf. (typo) A. Gray, Pl. Wright. 2: 90. 1853; cf. etiam (descriptione sine typo vel nomine) A. Gray, Pl. Wright. 1: 109. 1852.

E specie tantummodo foliorum segmentis linearibus vel vix lanceolato-linearibus, capitulis paulo minoribus differt.

Type specimen: Collected by *Charles Wright*, rocky hills on the San Pedro, western Texas, 1849 (Gray). Gray's name and description (Syn. Fl. N. Amer. loc. cit.) rest upon the variety given in Pl. Wright. 2: 90. 1853. The treatment in that work, however, gives first the reference to Pl. Wright. 1: 109. 1852, concerning a plant collected by Wright in western Texas, in 1849; and, second, the citation of *Wright 1237*, collected on prairies of the Leona and Nueces, Texas, May, 1851. Fortunately the two collections were identical.

Distribution: Widely distributed across Texas and reaching westwardly into New Mexico.

Specimens examined: *B. F. Bush 696*, common in sand, Dallas, Texas, May 10, 1900 (Mo.); *George L. Fisher 5007*, Houston, Texas, May 13, 1917 (U.S.); *B. H. A. Groth 66*, limestone hills near Bracken, Texas, July 8, 1903 (Field; Gray); *A. A. Heller 1730*, alt. 480–600 meters, Kerrville, Texas, May 7–14, 1894 (Field; Gray; Mo.); *Hort. Cantabr.*, cult. anno 1852 e sem. a C. Wrightio lectis (Gray);

G. Jermy 657, Iron Creek, Gillespie, Texas (Field; Mo.); *Marcus E. Jones 28012*, west of Uvalde, Texas, April 26, 1931 (Pom.); *idem 28013*, east of Carisso Spring, Texas, April 27, 1931 (Pom.); *E. J. Palmer 12115*, rocky hills, San Marcos, Texas, July 1, 1917 (Mo.); *J. Reverchon*, western Texas, 1882 (Gray); *Miss Ellen D. Schulz 367*, Austin, Texas, July, 1920 (U.S.); *Charles Wright*, Texas (Gray); *idem 217*, New Mexico, 1851 (Gray); *idem 1237*, prairies of the Leona and Nueces, western Texas, May, 1851 (Gray; Mo.; N.Y.; U.S.).

95. **Coreopsis rosea** Nutt. Gen. N. Amer. Pl. 2: 179. 1818. *Calliopsis rosea* (Nutt.) Spreng. Syst. Veg. 3: 611. 1826. *Conopsis rosea* Nutt. ex Less. Syn. Gen. Compos. 228. 1832 (sphalm). *Coreopsis rosea* f. *leucantha* Fern. Rhodora 21: 171. 1919.

Herba erecta, simplex vel ramosa, glabra, sub terra caulibus horizontalibus repens, caule supra terram tereti vel superne vix angulato 2–6 dm. alto. Folia opposita axillis saepe foliosis, basi ciliata parce connata, 2–5 cm. longa, integra vel irregulariter plus minusve 2- vel 3-partita, lamina vel segmentis linearibus, 0.5–3 mm. latis, eciliatis, apice parce acutis. Capitula ramulos tenues apicem versus nudos (pro pedunculis 3–8 cm. longis) aliter foliosos terminantia, radiata, pansa ad anthesin 2–2.5 cm. lata et 4–6 mm. alta. Involucri glabri bracteae exteriores 6–10, saepe irregulariter positae, mox patentes, oblonge lineari-lanceolatae, tantum 1–3 mm. longae; interiores oblongo-ovatae, basim versus connatae, 4–6 mm. longae. Flores ligulati circ. 8, rosei vel rarius albidi, ligula cuneato-oblongi, apice plerumque 3-lobati lobo mediano rursus lobulato, 8–13 mm. longi. Paleae lineares, 2–4 mm. longae. Flores tubulosi flavidi, stylorum ramis apice abrupte conico-incrassatis. Achaenia obcompressa, anguste elliptico-oblonga, nigra, exalata, glabra vel papillata, apice exaristata sed vix poculata, circ. 2 mm. longa.

Type specimen: None cited, but "open grassy swamps, from New Jersey to Georgia" given as the habitat.

Distribution: Southwesternmost Nova Scotia; Massachusetts to Delaware and (fide Nutt.) south to Georgia.

Specimens examined: *J. W. Adams 480*, Hankens Pond, on Petticoat Branch of Maurice River, Millville, New Jersey, August 15, 1926 (Gray); *anon.*, Smithfield, Rhode Island, 1871 (Gray); *C. F. Batchelder*, in water at marshy edge of pond, Falmouth, Massachusetts, August 14, 1906 (Gray); herb. *William Boott*, Winter Pond, Winchester, Massachusetts, July 30, 1876 (Gray); *J. Bernard Brinton*, low grounds, Egg Harbor, New Jersey, September 3, 1888

(Field); *idem*, Egg Harbor, August 18, 1889 (Field); *William M. Canby*, Felton, Delaware, September, 1867 (Gray); *idem*, swamps, Delaware, August, 1877 (Field); *J. Franklin Collins*, Spectacle Pond, Lincoln, Rhode Island, September 11, 1900 (Gray); *idem, M. L. Fernald, & H. H. York 294*, wet sand, margin of Sand Pond, Warwick, Rhode Island, September 8, 1914 (Berl.; Field); *Joseph W. Congdon*, Lincoln, Rhode Island, August 22, 1871 (Field); herb. *Carlton C. Curtiss*, Martha's Vineyard, August 13, 1892 (Field); *M. L. Fernald, E. B. Bartram, & B. Long 24687*, peaty and cobbly beach of St. John (Wilson's) Lake, Yarmouth County, Nova Scotia, July 23, 1921 (Gray); *iidem 24688*, peaty margin of Goven Lake, Yarmouth County, Nova Scotia, July 23, 1921 (Gray); *M. L. Fernald, C. H. Bissell, C. B. Graves, B. Long, & D. H. Linder 22859*, gravelly margin, northwest side of Tusket (Vaughan) Lake, Nova Scotia, August 20, 1920 (Gray); *Fernald & Long 10664*, damp, sandy shore of Loon Pond, Lakeville, Massachusetts, August 26, 1913 (Gray); *iidem 10669*, damp, sandy borders of ponds west of White Pond, Chatham, Massachusetts, September 9, 1913 (Gray); *iidem 17591*, forming a broad belt, wet, sandy lower beach and inundated margin, Buck Pond, Harwich, Massachusetts, August 30, 1918 (Gray); *iidem 17594*, eodem loco et tempore (Gray, 2 sheets); *iidem 24689*, wet, cobbly beach of Vaughan (Tusket) Lake, Nova Scotia, August 13, 1921 (Gray); *iidem 24690*, wet, peaty margin of Vaughan Lake at Gavelton, Nova Scotia, August 13, 1921 (Gray); *iidem 24691*, peaty and cobbly margin of Gilfilling Lake, Yarmouth County, Nova Scotia, August 23, 1921 (Gray); *iidem 24692*, peaty and sandy margin of Salmon (Greenville) Lake, Yarmouth County, Nova Scotia, August 25, 1921 (Gray); *iidem & D. H. Linder 22860*, cobbly beach of Tusket (Vaughan) Lake, Gavelton, Nova Scotia, September 4, 1920 (Gray); *iidem 22861*, wet, peaty shore, East Branch of Tusket River, Gavelton, September 4, 1920 (Gray); *iidem 22862*, sandy and gravelly beach of Butler's (Gavelton) Lake, Gavelton, September 4, 1920 (Gray); *Mrs. E. T. Gibbs*, South Pond, Plymouth, Massachusetts (Gray); *Jesse M. Greenman 437*, Nine Mile Pond, Cape Cod, Massachusetts, September 5, 1898 (Gray); *H. D. House 9660*, Artist's Lake, Middle Island, Suffolk County, New York, August 14, 1923 (Gray); *Edwin Hunt*, Sudbury, Massachusetts, August 12, 1874 (Field); *George G. Kennedy*, Orleans, Massachusetts, July 31, 1891 (Gray); *idem*, Sharon, Massachusetts, September 2, 1904 (Gray); *L. A. Kenoyer & F. W. Pennell 3224*, margin of Mares Pond, Falmouth, Massachusetts, July 29, 1911

(Gray); *Henry A. Lang*, Egg Harbor, New Jersey, September 10, 1905 (Gray); *E. S. Miller*, Long Pond, Wading River, New York, August 30, 1871 (Gray); *idem*, Wading River, August 18, 1877 (Field, 2 sheets); ex herb. *Thomas Morong*, pond borders, Winchester, Massachusetts, August 5, 1881 (Field); *John Murdoch, Jr.*, Orleans, Massachusetts, August 22, 1900 (Field); *Joseph Murdoch*, Rochester, Massachusetts, August 24, 1902 (Field); *Oakes*, in sandy, flooded places, Plymouth, Massachusetts (Gray); *C. F. Parker*, Bristol, Pennsylvania, August 11, 1865 (Field; Gray); herb. *Margaret P. (Mrs. Robert Shaw) Russell*, Snow's Pond, Rochester, Massachusetts, August 17, 1918 (Gray); *F. C. Seymour 1384*, in shallow water, Seth's Pond, West Tisbury, Martha's Vineyard, Massachusetts, September 7, 1917 (Gray); *Harold St. John 2939*, grassy shore of Long Pond, Southampton, New York, August 18–21, 1920 (Gray); *G. Thurber*, Cranston, Rhode Island, August, 1844 (Berl.); ex herb. *E. Tuckermann, Jr.*, New England (Berl.); *Emile F. Williams*, Cataumet, Cape Cod, Massachusetts, September 15, 1901 (Gray).

96. **Coreopsis Cardaminefolia** (DC.) Torr. & Gray, Fl. N. Amer. 2: 346. 1843. *Calliopsis Cardaminefolia* DC. Prodr. 5: 568. 1836. *Coreopsis Cardaminifolia* DC. ex Nutt. Trans. Amer. Phil. Soc. n. ser. 7: 360. 1841 (sphalm). *Coreopsis Cardaminefolia* var. *angustiloba* Torr. & Gray, loc. cit. *Coreopsis Cardaminefolia* var. *lineariloba* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 291. 1884.

Herba annua, glabra, erecta, gracilis, suberecte ramosa, 2–5 dm. alta, caulibus subteretibus, foliosis. Folia opposita, remota, quam internodia breviora, petiolata petiolis plerumque 1–4 dm. longis (summa sessilia), inferiora medianaque laminis 1–2-pinnata segmentis elliptico-oblongis vel late angusteve linearibus, superiora nunc pinnatim paucilobata nunc simplicia. Capitula saepe numerosa, tenuiter pedicellata pedicellis glabris 1–5 cm. longis, radiata, pansa ad anthesin tantum circ. 1.6–2.4 cm. lata et 6–8 mm. alta. Involucri glaberrimi bracteae exteriores 6–9, plus minusve lanceolatae atque irregulariter positae, saepe subacutae, marginibus diaphanae, 1–2 mm. longae; interiores ovatae 5–8 mm. longae. Flores ligulati circ. 7 vel 8, ligula oblongo-obovati, guttur versus macula brunneo-purpurea ornati alibi flavi, apice 3-lobati, ±1 cm. longi. Paleae filiformes, circ. 3–4 mm. longae. Flores tubulosi minuti, numerosi, corolla atro-purpurei, stylorum ramis apice obtusissime conicis. Achaenia elliptico-oblonga, valde obcompressa, faciebus glaberrima vel minute tuberculata, marginibus anguste vel late alata, circ. 2 mm. longa, apice calva vel minute bidentata.

Type specimen: The species was founded upon four specimens ("pl. exs. 1668, 1956, 1478, et 2312") collected by *Jean Luis Berlandier* at various locations in southeasternmost Texas and adjacent Mexico (Del.). DeCandolle gave three localities: (1) between Bexar (Bejar) and Trinity River; (2) at Matamoros, State of Tamaulipas, Mexico; (3) at Lake St. Nicholas, Corpus Christi Bay.

Distribution: Western Louisiana, Kansas, and Arizona southward to States of Tamaulipas, Coahuila, and Chihuahua, Mexico.

Specimens examined: *Berlandier 566*, Texas, May 15, 1829 (Mo.); *idem 882*, about Matamoros, State of Tamaulipas, Mexico, April, 1831 (Gray); *idem 1073*, from Matamoros northward to Nueces River, Texas, April, 1834 (Gray); *idem 1956*, Texas, May 15, 1829 (Gray); *idem 2312*, about Matamoros, State of Tamaulipas, April, 1831 (Gray); *idem 2503*, from Matamoros to Nueces River, Texas, April, 1834 (Gray; Mo.); *idem 2580*, Texas (Field); *R. S. Cocks*, Cameron, Louisiana, July, 1903 (Gray); *J. F. Collins 8*, wastes, Providence, Rhode Island, July 30, 1892 (Gray); *Miss M. B. Croft*, San Diego, Texas, 1885 (Field); *Thomas Drummond 68*, Brazos River, Texas (Gray); *A. Fendler 397* pro parte, Pawneefork, New Mexico, August, 1847 (Mo.); *idem 441*, New Mexico, 1847 (Gray; Kew); *J. Gregg 901*, prairie west of Matamoros, State of Tamaulipas, Mexico, June 5, 1847 (Mo.); *Dr. Hale*, Louisiana (Gray); *Elihu Hall 344* pro parte, wet places, Hempstead, Texas, May 28, 1872 (Field); *Herbert C. Hanson A13*, alt. 2,100 meters, wet places, Flagstaff, Arizona, August 22, 1922 (Field); *Harvard Univ. Bot. Gard.*, cult. e sem. Texanis anno 1849 (Gray); *W. W. Jones 160*, Verde Valley, Arizona, September 9, 1920 (Gray); *Lindheimer 102* p.p., Texas, 1843 (Gray); *D. T. MacDougal 293*, alt. 2,100 meters, vicinity of Flagstaff, Arizona, July 15, 1898 (Field; Gray); *E. W. Nelson 6104*, near Colonia García, in the Sierra Madre, State of Chihuahua, Mexico, August 25, 1899 (Gray); *idem 6813*, Sabinas, State of Coahuila, Mexico, May 21, 1902 (Gray); *E. W. Olive 72*, abundant in buffalo wallows, near Cinnamon City, Oklahoma, July, 1893 (Field); *J. H. Oyster 4014*, Kansas, September 7, 1884 (Field); *Edward Palmer 635*, States of Coahuila and Nuevo León, Mexico, February–October, 1880 (Gray); *idem 655*, San Lorenzo de Laguna and vicinity, southwest of Parras, State of Coahuila, May 1–10, 1880 (Field); *C. G. Pringle 8328*, alt. 210 meters, Río Grande Valley near Díaz, State of Coahuila, April 25, 1900 (Field; Gray; Pom.); *J. Reverchon 83*, western Texas, 1882 (Gray); *J. T. Rothrock 157*, alt. 2,010 meters, Zuni Village, New Mexico, July, 1874 (Field;

Gray); *B. C. Tharp 5627*, causeway, Corpus Christi, Texas, March 16, 1929 (U.S.); *J. W. Toumey 594*, Flagstaff, Arizona, June 30, 1892 (Gray); *Townsend & Barber 150*, alt. 2,250 meters, near Colonia García, in the Sierra Madre, State of Chihuahua, Mexico, July 19, 1899 (Field; Gray); *W. F. Thurrow*, Hockley, Texas, 1890 (Field); *C. Wright 340*, western Texas, October, 1849 (Gray); *idem 1236*, New Mexico, 1851 (Gray); *M. S. Young*, muddy hollow in the plains, near Paloduro Canyon, Texas, September 7, 1917 (Mo.).

97. **Coreopsis stenophylla** Boynt. Biltmore Bot. Studies 1: 141. 1902.

Herba glabra, annua vel vix perennis, 3–4 dm. alta, caulibus rigidis sed gracilibus, subfastigiate ramosis, omnino foliosis. Folia opposita, rigidula, erecta vel adscendentia, plerumque quam internodia longiora, simplicia vel irregulariter pinnata, lamina vel foliolis filiformibus vel anguste linearibus usque ad 2 mm. latis. Capitula subnumerosa, tenuissime pedicellata pedicellis ±5 cm. longis, radiata, pansa ad anthesin 2–3 cm. lata et ±6 mm. alta. Involucri bracteae exteriores circ. 8, lanceolatae, 1–2 mm. longae; interiores ovatae 5–6 mm. longae. Flores ligulati plerumque 8, flavi, ligula obovati, apice 3-lobati lobis rotundatis, 1–1.4 cm. longi. Flores tubulosi atro-rubri, stylorum ramis apice plus minusve truncatis. Paleae lineares, acutae. Achaenia plana, elliptico-oblonga, 1.5–2 mm. longa, marginibus anguste alata alis integris, apice bidentata dentibus brevibus crassis.

Type specimen: Collected for the *Biltmore Herbarium*, in pine woods near Hammond, Louisiana, September 17, 1900. The type, now probably destroyed, was in the Biltmore Herbarium. An excellent duplicate specimen is extant (N.Y.).

Distribution: Louisiana.

Specimens examined: Ex *Biltmore Herb.*, Hammond, Louisiana, September 17, 1900 (N.Y., cotype); *R. S. Cocks 3631*, dry, open, sandy fields, Shreveport, Louisiana, July, 1907 (N.Y.); *S. M. Tracy 3456*, Lake Charles, Louisiana, August 9, 1897 (N.Y.); ex herb. *C. L. Willich & F. W. Weiss*, loco ignoto (Berl.).

98. **Coreopsis similis** Boynt. in Small, Fl. S. E. United States 1278, 1340. 1903.

Herba annua, glabra, erecta, 1–3 dm. alta, caulibus sulcatis striatisque, ramosis. Folia opposita, polymorpha, principalia tenuiter petiolata petiolis usque ad 7 cm. longis, petiolo adjecto 2–8 (–13) cm.

longa, simplicia vel pinnatim partita, lamina vel foliolis oblonge linearibus vel elliptico-oblongis (raro oblongo-ovalibus), apice acutis vel obtusis, membranaceis, 5–12 mm. latis; summa simplicia vel pinnata, lamina vel foliolis plerumque angusto-linearibus. Capitula pauca vel numerosa, subcorymbosa, tenuissime pedicellata pedicellis ±5 cm. longis, radiata, pansa ad anthesin 1.5–2.5 cm. lata et 6–8 mm. alta. Involucri bracteae exteriores 7–9, lanceolatae vel interdum ovatae, glabratae, apice obtusae, 1.5–2 mm. longae; interiores ovatae, 4–5 mm. longae. Flores ligulati plerumque 8, supra guttur purpureo-rubri alibi flavi, ligula obovati, apice 3-lobati lobis rotundatis, ±1 cm. longi. Flores tubulosi numerosissimi, minuti, corolla atro-purpurei, stylorum ramis obtusissimo-apiculati. Achaenia plana, orbiculata, faciebus subnigris glabra, marginibus late alata unica ala diametro corpus (nunc 2 mm. longum et 0.5 mm. latum, nunc 3 mm. longum et 1 mm. latum) aequante, apice biaristata aristis tenuibus glabris externe ad alas plus minusve adgregatis tantum circ. 0.5 mm. longis.

Type specimen: Collected by *G. C. Nealley* at Brazos Santiago, Texas, 1889 (U.S.). The year is erroneously given by Boynton as 1899.

Distribution: Along the Gulf of Mexico coast, Texas.

Specimens examined: *W. L. Bray 48*, Virginia Point, Texas, April 16, 1899 (U.S.); *A. Arthur Heller 1548*, sea level to 12 meters alt., Corpus Christi, Texas, April 9–12, 1894 (Gray; Mo.; N.Y.); *G. C. Nealley*, Brazos Santiago, etc. (type, U.S.; cotype, Field); *Robert Runyon 335*, Brownsville, Texas, January, 1923 (U.S.).

99. **Coreopsis Atkinsoniana** Dougl. in Lindl. Bot. Reg. *pl. 1376*. 1830. *Calliopsis Atkinsoniana* (Dougl. in Lindl.) Hook. Fl. Bor. Amer. 1: 311. 1833.

Herba annua vel plus minusve perennis, erecta, glabra, 6–12 dm. alta, ramosa ramis arcuato-adscendentibus vel suberectis, caulibus angulatis, internodiis saepius elongatis. Folia radicalia 1–3-(saepius 2-) pinnatisecta segmentis lineari-oblongis vel anguste elliptico-lanceolatis terminali multo majore petiolo 2–8 cm. longo, 1–2 dm. longa; caulina plerumque 1–2-pinnatisecta segmentis anguste linearibus vel lineari-subspathulatis. Capitula subnumerosa, tenuiter pedunculata pedunculis glabris plerumque 5–15 cm. longis, radiata, pansa ad anthesin 3–5 cm. lata et 7–10 mm. alta. Involucri bracteae exteriores 8–12, saepe irregulariter positae, lineari-oblongae, glabrae, margine scariosae, apice obtusae, 1–3 mm. longae; interiores ovatae, saepissime glaberrimae, 6–8 mm. longae.

Flores ligulati plerumque 8, guttur versus brunneo-purpurei alibi flavi, ligula cuneate obovati, apice 3-lobati lobo mediano rursus 2–3-lobulato, 1.2–1.8 cm. longi. Paleae tenuiter oblongo-lineares, marginibus scariosae alibi aurantiaco-rubrae, ±5 mm. longae. Flores tubulosi corolla purpureo-rubri, stylorum ramis apice abrupte subtruncatis. Achaenia valde obcompressa, nigra, oblonga vel oblongo-oblanceolata, faciebus glabra vel minutissime sparsimque papillatal marginibus angustissime alata, 2.4–2.8 mm. longa, apice calva ve, vix bidentata.

Type specimen: Collected by *David Douglas* on Mewries (or Menzies, cf. DC. Prodr. 5: 568. 1836) Island in the Columbia River in 1825.

Distribution: Saskatchewan and British Columbia southwardly to Oregon, Arizona, and South Dakota.

Specimens examined: *L. R. Abrams 9465*, Hood River, Hood River County, Oregon, July 25–28, 1922 (Pom.); *Anon.*, cult. ex sem. ex herb. DeCand., anno 1839 (Gray); *E. Bourgeau*, rare, near lake on the prairie, Saskatchewan, September 17, 1857 (Kew); *Townsend S. Brandegee*, the Dalles, Oregon, 1882 (Calif.); *Douglas*, North America (Gray); *idem*, Fort Vancouver, British Columbia (Gray); *Drake & Dickson*, Bradfords Island, Columbia River, June, 1889 (Field); *A. D. E. Elmer 601*, sand-gravel shores of Palmer Lake, northwest of Loomiston, Washington, August, 1897 (Berl.; Pom.); *Griffiths*, Highmore, South Dakota, July, 1897 (Berl.); *Elihu Hall*, Oregon (Field); *idem*, cult. from Dakota seed, 1877 (Gray); *W. G. W. Harford & George W. Dunn*, Cascades, northwestern United States, May 28, 1869 (Berl.); *A. Arthur Heller*, Coeur d'Alene River, near Harrison, Idaho, July 12, 1892 (Field); *idem*, about Lake Pend d'Oreille, near Lakeview, Idaho, August 1–10, 1892 (Pom.); *Thomas J. Howell*, Oregon, 1881 (Field); *idem*, Klickitat, Washington, June, 1881 (Field); *idem*, banks of Columbia River, July, 1881 (Berl.); *idem 224*, Multnomah County, Oregon, July, 1877 (Gray); *Marcus E. Jones*, Sand Point, Idaho, September 18, 1908 (Pom.); *Frank O. Kreager 315*, marshy shore of Lake Calispell, Stevens County, Washington, July 28, 1902 (Gray); *John B. Leiberg 1542*, alt. 640 meters, region of Coeur d'Alene Mountains, Idaho, August 17, 1895 (Field; Gray; Pom.); *Lemmon 4159*, meadow near San Francisco Mountains, Arizona, September, 1884 (Gray); *Dr. Lyall*, Cascade Mountains to Fort Colville, lat. about 49° N., 1860 (Gray); *idem*, from Fort Colville to Rocky Mountains (Oregon Boundary), 1861 (Berl.); *Daniel T. MacDougal 617*, Lakeview, Idaho, August,

1892 (Field); *Ernest MacKay 25*, very abundant in wet sand, head of Grand Coulee, Douglas County, Washington, July 12, 1902 (Gray; Pom.); *J. M. Macoun*, between Kettle and Columbia Rivers, Waneta, British Columbia, July 28, 1902 (Berl.; Field; Gray; Pom.); *J. C. Nelson 1980*, sandy shore of Columbia River, Hayden Island, Oregon, September 8, 1917 (Gray); *Frank W. Peirson 3900*, near Biggs, Oregon, July 16, 1923 (Pom.); *C. G. Pringle*, banks of Columbia River, Washington, September 10, 1881 (Field); *Margaret P. (Mrs. Robert Shaw) Russell*, Hood River, Oregon, August 15 (Gray); *J. H. Sandberg, D. T. MacDougal, & A. A. Heller 617*, on shores near Farmington Landing, Lake Coeur d'Alene, Idaho, July 11, 1892 (Berl.; Field; Gray; Pom.); *E. P. Sheldon 11081*, Bonneville, Oregon, August 10, 1902 (Gray; Pom.); *Sherff 250* pro parte, cult., St. Louis, Missouri, July 6, 1910 (Gray); *Rev. Mr. Spalding*, Clear Water, Oregon (Gray); *W. N. Suksdorf*, bottom lands of the Columbia River, Washington, August 26, 1882 (Berl.); *G. R. Vasey 551*, Washington, 1889 (Gray); *Sereno Watson 217*, Bed of Columbia River, Old Fort Colville, Washington, October 3, 1880 (Gray); *idem* (similiter) *217*, mouth of the Chelan, Columbia River, Okanogen County, Washington, October 12, 1880 (Gray).

100. **Coreopsis Leavenworthii** Torr. & Gray, Fl. N. Amer. 2: 346. 1843. *Coreopsis angustata* Greene, Pittonia 4: 239. 1901.

Folia simplicia.....var. δ *Lewtonii*.

Folia principalia 1–2-pinnata.

Foliorum caulinorum foliola terminalia nunc obovata nunc lanceolato-oblonga, 0.8–1.5 cm. lata.....var. β *Garberi*.

Foliorum caulinorum foliola terminalia (vel eorum segmenta ultima) circ. 1–3 mm. lata.

Folia basalia pinnatim circ. 9-partita.....var. γ *Curtissii*.

Folia basalia integra.....*C. Leavenworthii* sensu stricto.

Herba annua, erecta, glabra, 5–15 dm. alta, caulibus teretibus subsimplicibus vel suberecte ramosissimis, omnino vel fere usque ad summam foliosis. Folia opposita, ima integra elongate linearispathulata, quam internodia longiora, petiolis ±1 dm. longis, laminis ±5 cm. longis et saepius 3–5 mm. latis; principalia internodiis longiora, saepius 2–5-partita segmentis anguste linearibus plerumque 1–3 mm. latis et petiolo elongato plus minusve similibus; summa integra, internodiis breviora. Capitula pauca vel numerosa, paniculato-corymbosa, tenuiter pedicellata, radiata, pansa ad anthesin 2–3 cm. lata et circ. 5–6 mm. alta. Involucri bracteae exteriores

circ. 6–10, saepe irregulariter positae, lineari-lanceolatae vel ovato-lanceolatae, saepe coloratae, apice obtusae, margine plus minusve diaphanae, tergo plerumque scabridae, tantum 1–2 mm. longae; interiores ovatae, supra pubescentes, 5–7 mm. longae. Flores ligulati circ. 8, flavi, ligula obovati, apice 3-lobati lobis triangulato-rotundatis mediano majore saepe emarginato, 0.8–1.5 cm. longi. Paleae lineares vel subfiliformes, acutae, demum circ. 2–4 mm. longae. Flores tubulosi numerosi, minuti (circ. 2.2 mm. longi), stylorum ramis apice lato-conicis. Achaenia obcompressa, glabra, corpore nigro 2–3 mm. longo et circ. 0.5–0.7 mm. lato lineari-oblonga, marginibus membranaceo-alata ala subbrunnea corporis latitudinem aequante vel superante, apice biaristata aristis erectis tenuibus antrorsum hispidulis circ. 0.3–0.6 mm. longis.

Type specimen: Collected by *Melines C. Leavenworth*, in Florida. The first cited specimen came from Tampa Bay (Gray).

Distribution: Florida.

Specimens examined: *John H. Barnhart 2715*, moist ground near Ehren, April 26–May 16, 1899 (Field); *F. S. Blanton 6972*, wet ditch, roadside, south of Lakeland, March 28, 1930 (Field); *Mrs. E. G. Britton 132*, prairie west of Cutter, March 23, 1904 (Field); *Buckley*, Florida (Gray); ex herb. *William Canby*, shores of Indian River, February, 1889 (Gray); *A. H. Curtiss 5375*, shore of Lake Worth, May 8, 1895 (Gray; Pom.); *Mrs. Charles C. Deam 1709*, border of Lake Worth, near West Palm Beach, February 22, 1904 (Gray); *A. Fredholm 5473*, prairie, Orange County, August 8, 1902 (Gray); *idem 5778*, low prairie, Okeechobee region, Brevard County, April 13, 1903 (Gray); *idem 6094*, swamp, Osceola County, October 12, 1903 (Gray); *A. P. Garber*, Tampa Bay, 1876 (Gray); *idem*, Keys of Florida, 1876 (Gray); *idem*, Mellonville, March, 1876 (Field); *idem*, Lake Monroe, March, 1876 (Field); *idem*, Tampa, May, 1876 (Field); *idem*, Rosewood, June, 1876 (Field); *W. Garvens*, vicinity of Palm Beach, February 15–March 15, 1908 (Field); *Albert S. Hitchcock*, New River, December 26, 1895–January 11, 1896 (Field); *idem*, Palm Beach, eodem tempore (Field); *idem*, Levy County, June–July, 1898 (Field); *William Kellogg*, Owanita, about March 18, 1907 (Gray); *Dr. Leavenworth*, Tampa Bay (type, Gray); *George V. Nash 832*, hummock land, vicinity of Eustis, May 16–31, 1894 (Berl.; Field; Gray); *idem 1257*, eodem loco, July 1–15, 1894 (Berl.; Gray); *idem 1876*, Orange Bend, May 28–June 15, 1895 (Pom.); *Edward Palmer 286*, Indian River, 1874 (Gray); *Fannie R. Randolph 136*, moist sand among sand dunes near Lake Worth, Kelsey City,

January 2, 1921 (Gray; foliis omnibus simplicibus); *F. Rugel 102*, Florida (Field); *idem 142*, Florida, 1845 (Mo.); *John K. Small & J. J. Carter*, Bull Key, opposite Lemon City, November 6, 1903 (Field); *iidem 1219*, Fort Lauderdale, November, 1903 (Field); *John Donnell Smith*, grassy pine barrens, Sumter County, March 21, 1883 (Field); *Miss Jeanette P. Standley 195*, in pine land, vicinity of Fort Myers, May 20, 1916 (Field; Gray); *F. C. Straub 97*, Port Orange, April 9, 1895 (Gray); *idem 159*, eodem loco, May 18, 1895 (Gray); *S. M. Tracy 6920*, Palma Sola, May 16, 1900 (Mo.); *idem 6921*, eodem loco et tempore (Field, 2 sheets; N.Y.; U.S.; cotypes of *Coreopsis angustata* Greene); *idem 7704*, Braidentown, June 15, 1901 (Berl.; Field; Gray); *H. J. Webber*, Sanibel Island, January 29, 1896 (Field); *idem 414*, margin of Lake Worth, West Palm Beach, June 7, 1896 (Field).

Coreopsis Leavenworthii var. β **Garberi** A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 291. 1884.

Folia caulina omnia pinnatim 5–7-partita foliolis brevioribus latioribusque, terminali subobtuso nunc obovato nunc lanceolato-oblongo, 0.8–1.5 cm. lato.

Type specimen: Collected by *Abraham Pascal Garber*, Tampa, Florida, May, 1876 (Gray).

Distribution: Known only from type locality of Tampa, Florida.

Specimens examined: *A. M. Ferguson*, pine barrens, Tampa, June–July, 1898 (Mo.); *A. P. Garber*, Tampa, May, 1876 (type, Gray).

Coreopsis Leavenworthii var. γ **Curtissii** Sherff, Bot. Gaz. 94: 592. 1933.

Folia 1–2-pinnata; basalia pinnatim circ. 9-partita, foliolis oblongo-linearibus ad basim sensim angustatis plerumque 2–4 cm. longis et 2–5 mm. latis, lateralibus (praecipue inferioribus) utrinque saepe rursus 1-lobatis lobo parvo linearique; caulina quam internodia nunc multo longiora nunc multo breviora, plerumque 2-pinnata foliolis lateralibus saepius 3 vel 4 jugis, segmentis ultimis omnibus 0.5–2.5 cm. longis et circ. 1–3 mm. latis.

Type specimen: Collected by *Allen Hiram Curtiss*, No. 6734, in dry, pastured ground along the Suwannee River, near Branford, Florida, October 23, 1900 (Gray, 2 sheets).

Distribution: Known only from type locality in Florida.

Specimens examined: *Curtiss 6734* (Gray, 2 type sheets).

Coreopsis Leavenworthii var. δ **Lewtonii** (Small) Sherff, Bot. Gaz. 94: 592. 1933. *C. Lewtonii* Small, Bull. Torr. Bot. Club 25: 146. 1898.

E specie foliis simplicibus plerumque quam internodiis brevioribus radice saepe perenni differt.

Type specimen: Collected by *Frederick Lewis Lewton*, Forest City, Florida, 1894 (N.Y.).

Distribution: Florida.

Specimens examined: *Liberty H. & Ethel Zoe Bailey 13047*, sands at Sarasota, September 28, 1929 (Field); *A. H. Curtiss 1480*, swamps and shores, Halifax River, June (Berl.; Field, 2 sheets; Gray); *A. A. Eaton 469*, Little River, Dade County, December 5, 1903 (Field, 2 sheets); *Albert S. Hitchcock 139*, around flatwood ponds, Myers, July–August, 1900 (Field); *Frederick L. Lewton*, Forest City, 1894 (type, N.Y.); *idem*, Cedar Hammock, Sumter County, August 3, 1894 (N.Y.); *George V. Nash 2255*, Sanford, July 24, 1895 (Berl.; Field; Gray); *F. Rugel 133*, Florida, 1843 (Gray; Mo., 2 sheets); *J. K. Small & J. J. Carter 3025*, the Everglades, intersecting Long Key, January 18–26, 1909 (N.Y.); *John Donnell Smith*, pine-barren ponds, Pellicier's Creek, St. John's County, March 4, 1882 (Field, 3 sheets; Gray); *S. M. Tracy 7256*, Long Key, May 8, 1901 (Berl.; Field; Gray); *idem 7355*, Perico Island, December 6, 1901 (Gray; Mo.).

101. **Coreopsis saxicola** Alex. Torreya 32: 161. 1932.

Herba perennis, erecta, glabra, suberecte ramosissima, saltem superne foliosissima, 7–10 dm. alta, caule subtereti ramis tetragonis. Folia opposita, principalia petiolata petiolis eciliatis inferne dilatatis basi connatis saepius 1–4.5 cm. longis, pinnata vel bipinnata segmentis oblongo-linearibus sparsim minuteque ciliatis 2–9 (rarius –13) mm. latis (raro multa simplicia spathulataque). Capitula corymbose disposita, tenuiter pedunculata pedunculis ±1 dm. longis, radiata, pansa ad anthesin 2.5–4 cm. lata et circ. 1–1.2 cm. alta. Involucri bracteae exteriores plerumque 7 vel 8, lanceolatae, apice acutae vel subacutae ac saepe hispido-ciliatae alibi glabrae, marginibus albidae, 7–9 mm. longae; interiores oblongo-ovatae paulo longiores. Flores ligulati circ. 8, subaurantiaci, ligula oblongi vel cuneato-obovati, apice tenuiter lobati lobis plus minusve lobulatis, ±1.5 cm. longi. Paleae lineares, superne attenuatae atque elongatae, demum circ. 6–8 mm. longae. Florum tubulosorum styli ramorum terminis breviter conici. Achaenia obcompressa, valde

incurva, circumambitu orbiculata vel obovato-orbiculata, atra, faciebus glabra vel papillata, circ. 2 mm. longa et (alis brunneis irregulariter pectinato-laceratis inclusis) circ. 2–2.5 mm. lata, apice demum calva.

Type specimen: Collected by *Francis W. Pennell*, No. 4029, on thin soil over granite, Stone Mountain, DeKalb County, Georgia, August 2, 1912 (N.Y.).

Distribution: DeKalb County, northern Georgia, westward into Tallapoosa County, Alabama.

Specimens examined: *F. S. Earle 2147*, Double Bridges, Tallapoosa County, Alabama, August 9, 1899 (N.Y.); *H. Eggert*, Stone Mountain and vicinity, DeKalb County, Georgia, July 23, 1897 (Mo., 2 sheets; N.Y.); *F. W. Pennell 4029* (type, N.Y.); *John Kunkel Small*, alt. 300–450 meters, on and about Stone Mountain, Georgia, August 1–6, 1895 (Field; N.Y.); *Karl M. Wiegand & W. E. Manning 3421*, sandy soil, northwest base of Stone Mountain, Georgia, August 17, 1927 (Pom.; forma foliis plerumque simplicia); *iidem 3422*, turfy rocky slope, base of Stone Mountain, Georgia, August 17, 1927 (Pom.).

An anomalous species, combining the foliar habit, involucre, and paleae of *Eucoreopsis* (especially *C. grandiflora*) with the lacerate-winged achenes of species like *C. Linifolia*. The tips of the style branches of the disc florets are somewhat intermediate, being less elongate-cuspidate than in the former but more definitely conical than in the latter.

102. **Coreopsis paludosa** M. E. Jones, Contr. West. Bot. 12: 46. 1908.

Herba annua, erecta, glabra, subsucosa, simplex vel paniculato-ramosa, ±6 dm. alta, internodiis elongatis usque ad 1.7 dm. longis. Folia alterna, nunc simplicia (pro ramis vel plantis parvis), anguste spathulata, 3.5–7 cm. longa et 2–5 mm. lata, lamina sensim in petiolum subaequalem decurrente, integra, apice subobtusa; nunc 1–2-pinnata (pro plantis majoribus), majora (radicem versus posita) 1.5–2.25 dm. longa petiolata petiolo ±8 cm. longo foliolis linearis-spathulatis apice subobtusis (lateralibus circ. 3 jugis, 2–4 cm. longis et 1.5–3.5 mm. latis terminali circ. 6–8 cm. longo et 7–8 mm. lato) saepius (ad marginem ad folii terminum spectantem) 1-lobatis lobo ±8 mm. longo; altera minora, 1-pinnata, foliolis lateralibus 2 jugis. Capitula pauca (±15), tenuiter pedicellata pedicellis usque ad 8 cm. longis, radiata, pansa ad anthesin ±3.5 cm. lata et circ. 7–8 mm.

alta. Involucri glabri bracteae exteriores 4–6, oblongae, apice obtusae, plurinervatae, margine plus minusve hyalinae, adpressae vel rarius patentes, circ. 2 mm. longae; interiores ovatae, superne subelongatae, demum 6–8 mm. longae. Flores ligulati circ. 8, ligula rhomboideo-obovati, ad ligulae basim purpureo-maculati aliter flavi, supra medium 3-lobati lobis lateralibus parvis terminali multo majore, 1.5–2 cm. longi. Paleae anguste lineares, glaberrimae, 4–5 mm. longae. Florum tubulosorum stylorum rami termino truncati. Achaenia obcompressa, nigra, anguste obovata, basi flavo-callosa, faciebus glaberrima, marginibus pectinatim cartilagineo-dentata dentibus brunneis quam 0.1 achaenii latitudinis non longioribus, apice calva, 2.4–3.2 mm. longa et circ. 1.2–1.4 mm. lata.

Type specimen: Collected by *Marcus E. Jones* at altitude of 2,100 meters, growing in water in creeks, etc., Marsh Lake, Sierra Madre, State of Chihuahua, Mexico, September, 1903 (Pom.).

Distribution: Known only from type locality in State of Chihuahua, Mexico.

Specimens examined: *Marcus E. Jones*, alt. 2,100 meters, Meadow Valley, Sierra Madre, State of Chihuahua, September 17, 1903 (Pom.; an associate type).

103. **Coreopsis Linifolia** Nutt. Journ. Acad. Phila. 7: 75. 1834. *Coreopsis callosa* Bertol. Misc. Bot. 7: 42. 1848.

Herba perennis, glabra, pallida, erecta, 5–7 dm. alta, caulibus gracilibus, supra ramosis, plus minusve tetragonis. Folia opposita vel inferiora alterna, integra, inferiora laminis spathulata vel oblanceolata quam internodia breviora (vel basalia interdum duplo longiora) 4–9 mm. lata apice rotundata basi petiolata petiolis saepius 1–4 cm. longis; alia sessilia, linearia, apice saepe truncata vel obtusissima, multo minora. Capitula pauca, corymboso-paniculata, tenuiter pedunculata pedunculis saepius 3–7 cm. longis, radiata, pansa ad anthesin 2–3 cm. lata et circ. 6–7 mm. alta. Involucri bracteae exteriores circ. 6–8, glabratae, saepe irregulariter positae, ovatae, longitudinaliter pluristriatae, lateribus scariosae, apice subacutae vel rotundatae, 1–3 mm. longae; interiores oblongo-ovatae, saepius glabrae, 5–8 mm. longae. Flores ligulati circ. 7 vel 8, flavi, ligula obovati, apice 3-lobati lobo mediano emarginato, 1–1.5 cm. longi. Paleae lineares, apice acutae, circ. 5–6 mm. longae. Flores tubulosi corolla atro-purpurei, stylorum ramis apice obtuse conicis. Achaenia plana, oblonga vel ovalia, subnigra, faciebus glabra, marginibus ornata ala irregulariter lacerata circ. 0.2–0.3 corporis latitudinis

lata, corpore circ. 3 mm. longa, apice tenuiter biaristata aristis sparsim antrorsumque hispidis ±1 mm. longis.

Type specimen: Collected in Alabama (Brit.?).

Distribution: North Carolina to Florida, thence westwardly to Alabama and Mississippi.

Specimens examined (formerly confused by me in herbaria with *C. longifolia* Small; for that reason there are cited here only the few specimens which have been recently reexamined): *A. W. Chapman*, wet barrens, Florida (Field); ex herb. *eiusdem 174b*, swamps in the pine barrens, Apalachicola, Florida, September 22, 1879 (Gray; Mo.); *A. B. Langlois*, Spring Hill, southern Alabama, October 1, 1880 (Field); *J. Skehan*, Ocean Springs, Mississippi, September 16, 1895 (Mo.); *John Donnell Smith*, open tidal marshes on Biloxi Bayou, Harrison County, Mississippi, September 16, 1885 (Field; Gray); *S. M. Tracy 4778*, Koshtaw, Mississippi, October 25, 1898 (Field; Mo.); *idem 8565*, Gateswood, Alabama, October 31, 1903 (Field; Gray; Mo.).

The type of *Coreopsis callosa* Bertol. has not been seen by me. Bertoloni's long description, however, fits *C. Linifolia*. His concluding observation ("Haec species appropinquaret *Coreopsidem angustifoliam* Ait., si haberet omnia folia alterna, et lanceolato-linearia") shows beyond doubt that he had our *C. Linifolia* before him. Moreover, Bertoloni's type had been collected by Dr. Gates in Alabama. A Gates specimen still extant (N.Y.; not cited above) was undoubtedly a duplicate. I found this latter to be typical *C. Linifolia*.

104. **Coreopsis longifolia** Small, Bull. Torr. Bot. Club 22: 47. 1895. *C. angustifolia* Dryand. in Ait. Hort. Kew. ed. 1. 3: 253. 1789. (Non L. Sp. Pl. 908. 1753.)

Herba perennis, glabra, pallida, 7–12 dm. alta, erecta, caulibus simplicibus vel summam versus parce ramosis, teretibus. Folia alterna, integra, basalia (petiolis elongatis adjectis saepius 1–2 dm. longa) quam internodia multo longiora laminis linearia vel linearioblonga vel lineari-lanceolata 2–11 mm. lata apice plus minusve acuta marginibus saepe subscariosa; superiora sessilia, ad bracteas lineares plus minusve reducta. Capitula pauca paniculato-corymbosa, tenuiter pedunculata pedunculis usque ad 2 dm. longis, radiata, pansa ad anthesin 3–5.5 cm. lata et ±1 cm. alta. Involucri bracteae glabrae exteriores circ. 7–9, ovatae vel oblongo-lanceolatae, lateribus plus minusve diaphanae, apice saepe rotundo-dilatatae, 2–5 mm. longae; interiores oblongo-ovatae 6–12 mm. longae. Flores ligulati circ. 8, flavi, ligula cuneate obovati, apice 3-lobati lobo mediano

rotundato vel emarginato, 1.5–2.5 cm. longi. Paleae oblonge lineares, acutae, demum usque ad 1 cm. longae. Flores tubulosi corolla atro-purpurei, stylorum ramis apice obtusissime conicis. Achaenia plana, corpore ipso circ. 4 mm. longo atra et circumambitu (alis exclusis) oblonga vel late linearia, faciebus glabra margine pectinato-alata dentibus brunneis quam corporis diametro 0.3–0.6 brevioribus, apice breviter biaristata aristis antrorsum setulosis saepe caducis.

Type specimen: Collected by *Allen Hiram Curtiss*, No. 4489, in dry, grassy pine woods about Jacksonville, Florida, October 16, 1893 (N.Y.).

Distribution: North Carolina, Georgia, and Florida.

Specimens examined (perhaps several additional specimens determined by me some years ago for various herbaria as *C. Linifolia* Nutt. will be found to belong here): *Curtis*, North Carolina (N.Y.); *A. H. Curtiss*, Florida, November (Field); *idem*, near Jacksonville, Florida, September (Gray); *idem 1470*, margin of swamp near Jacksonville, Florida, October (Pom.); *idem 1477* pro parte, moist pine barrens near Jacksonville, November (Field, 2 sheets; N.Y.); *idem 4489* (N.Y., 2 type sheets); *idem 5266*, moist pine barrens near Jacksonville, October 15, 1894 (Field; Gray; N.Y., 2 sheets; U.S.); *idem 5348* pro parte, thickets bordering swamps near Jacksonville, October 22, 1894 (N.Y.); *idem 5568*, moist, grassy pine barrens near Jacksonville, October 7, 1895 (Field; Gray; Mo., 2 sheets; Pom.); *idem 6278*, sides of ditch near Jacksonville, October 31, 1898 (Field; Gray); *Mary E. Francis 155*, low grounds, Alva, Florida, November 25, 1917 (U.S.); *A. P. Garber*, Levy County, Florida, November, 1877 (Field; Gray; U.S.); herb. *Otto Katzenstein*, southeastern United States, September 23, 1897 (Gray); *L. H. Lighthipe 557*, South Jacksonville, Florida, October 30, 1896 (N.Y.); *F. Rugel 480*, Florida, 1845 (Field; U.S.); *J. H. Simpson*, Manatee, Florida, 1889 (U.S.); *J. K. Small & J. J. Carter 1028*, pine lands, Fort Lauderdale, Florida, November 19–25, 1903 (Field); *J. K. Small & G. V. Nash*, the Everglades, west of Miami, Florida, November 1–9, 1901 (N.Y.); *Miss Jeanette P. Standley 423*, low pine land, vicinity of Fort Myers, Florida, October 25, 1916 (Pom.); *S. M. Tracy 7142*, Braidentown, Florida, October 16, 1900 (Field; Gray; Mo.; N.Y.; U.S.).

Passes into *C. gladiata*.

105. **Coreopsis falcata** Boynt. Biltmore Bot. Studies 1: 141. 1902.

Herba perennis, pallida, glabra, 8–12 dm. alta, caulibus teretibus, summam versus corymbose ramosis. Folia alterna, inferiora petio-

lata petiolis 1–1.5 dm. longis lamina (aequaliter 1–1.5 dm. longa; 0.6–3 cm. lata) elliptico-oblonga vel linearia vel lineari-oblanceolata terminaliter nunc obtusa nunc longe attenuata marginibus integra vel saepe 1–2-lobata lobis angustis adscendentibusque; superiora sessilia, multo minora, angustiora, lateraliter saepe 1-plus-lobata. Capitula pauca vel vix subnumerosa, tenuiter pedunculata pedunculis ±1 dm. longa, radiata, pansa ad anthesin 3–5 cm. lata et 6–9 mm. alta. Involucri glabri bracteae exteriores circ. 8–10, lanceolatae, 4–7 mm. longae; interiores ovatae vel oblongo-lanceolatae, dimidio longiores. Flores ligulati circ. 8, aurantiaco-flavi, ligula cuneato-obovati, apice 3-lobati lobo mediano majore rotundato vel emarginato, 1.3–2.3 cm. longi. Paleae lineares, acutae. Achaenia plana, oblonga, corpore circ. 4.5 mm. longa, marginibus alata alis latis pectinatis dentibus corporis diametrum fere aequantibus, apice biaristata aristis usque ad 1 mm. longis.

Type specimen: Collected for the *Biltmore Herbarium*, in shallow water near Pembroke, North Carolina, June, 1901. The type proper was preserved in the Biltmore Herbarium, where it was doubtless destroyed later on by flood waters. A sheet of fine duplicate material is still extant, however (N.Y.).

Distribution: North Carolina to Georgia.

Specimens examined: *Anon.*, Georgia (Gray); *anon.*, Macon, Georgia (N.Y.) (these first two specimens are doubtless of the same collection; the first had been studied by Asa Gray and was regarded by him as *C. gladiata* in his *Synoptical Flora of North America;* the second had come from John Torrey's private herbarium and was under the name *C. gladiata;* this latter specimen was probably the basis for Torrey and Gray's words "sometimes 1–2-ternately-parted" in describing the lower leaves of *C. gladiata* [Fl. N. Amer. 2: 347. 1843]); ex *Biltmore Herb.*, shallow water near Pembroke, North Carolina, etc. (cotype, N.Y.); ex *eodem 14758b*, shallow water or wet places in pine lands, Selma, North Carolina, May 31, 1902 (N.Y.); *Cuthbert*, in pool, Georgia, October 10, 1898 (N.Y.); *Karl M. Wiegand & W. E. Manning 3410*, dry pine woods, 7 miles north of Washington, North Carolina, June 21, 1927 (Pom.).

106. **Coreopsis gladiata** Walt. Fl. Carol. 215. 1788. *C. dichotoma* Michx. Fl. Bor. Amer. 2: 137. 1803.

Herba perennis, glabra, pallida, erecta, 6–8 dm. alta, caulibus teretibus vel vix angulatis, supra ramosa et subnudata. Folia plerumque alterna, integra, inferiora petiolata petiolis elongatis quam inter-

nodia plerumque multo longiora laminis elliptico-oblonga vel oblanceolata marginibus scariosa plerumque 1–2.5 cm. lata apice rotundata atque interdum aegre mucronata; superiora sessilia, multo minora, linearia vel spathulato-linearia. Capitula pauca, subcorymbosa, tenuiter pedunculata pedunculis glabris ±1 dm. longis, radiata, pansa ad anthesin 3–4 (–6) cm. lata et 8–11 mm. alta. Involucri glabri bracteae exteriores 4–10, saepe biseriatim dispositae, ovatae vel lanceolatae, plerumque obtusae, lateraliter scariosae, 2–4 (–6) mm. longae; interiores oblongo-ovatae 8–12 mm. longae. Flores ligulati circ. 8, flavi, ligula cuneato-obovati, apice 3-lobati lobo mediano rotundato vel saepius emarginato, 1–2.5 cm. longi. Paleae lineares, apice acutae, demum ±8 mm. longae. Flores tubulosi corolla atro-purpurei, stylorum ramis apice late breviterque conicis. Achaenia plana, elliptico-oblonga, faciebus nigris glabra, marginibus anguste pectinato-alata, corpore circ. 3.5 mm. longa, apice biaristata aristis tenuibus antrorsum hispidis.

Type specimen: No specimen cited. The plant in mind was native to Carolina. My notes contain no mention of an authentic (author's) specimen among the Walter specimens in London (Brit.).

Distribution: North Carolina to southern Florida and westwardly to southern Mississippi.

Specimens examined: *C. Billington 131*, low places near salt water, Lynn Haven, Bay County, Florida, October 15, 1921 (U.S.); *Biltmore Herb.* (ex herb. *A. W. Chapman*) *2066b*, low pine barrens, Apalachicola, Florida, September 22, 1879 (Mo.; U.S.); *J. Brownfield*, Summerville, South Carolina, October, 1892 (Mo.); *William M. Canby*, vicinity of Wilmington, North Carolina, October, 1867 (Field; Mo.); ex herb. *A. W. Chapman*, southern Florida (Field; U.S.); *A. H. Curtiss*, Chattahooche, Florida, 1875 (U.S.); *idem 1477* pro parte, moist pine barrens near Jacksonville, Florida, November (Gray; Mo.); *Roland M. Harper 1666* p.p., wet barrens north of Moultrie, Georgia, September 24, 1902 (Berl.; Mo.; U.S.); *Albert S. Hitchcock 910*, New River, Florida, December 26, 1895–January 11, 1896 (Field); *Gerald MacCarthy*, eastern North Carolina, 1883 (Field); *Michaux*, North America (Berl., sub nom. *Coreopside dichotoma* Michx.); *Charles Mohr*, margins of pine-barren swamps, Poplarville, Mississippi, October 18, 1894 (U.S.); *John H. Redfield 5630*, near foot of Blue Ridge, Caesar's Head, South Carolina, September 3, 1876 (Mo.); *F. Rugel*, Florida, 1842–1849 (Mo.; foliorum apicibus *C. longifoliae* adpropinquans); *John K. Small & J. J. Carter 694*, in the Everglades, between Cocoanut Grove and

Cutler, Florida, October 31–November 4, 1903 (N.Y.); *iidem 954*, in pine lands, Fort Lauderdale, Florida, November 19–25, 1903 (Field; N.Y.); *iidem 2731*, pine lands between Perrine and Larkin, Florida, November 16, 1906 (N.Y.); *iidem & G. K. Small 3401*, in the Everglades, Cutler to Homestead, Florida, February 15, 1911 (N.Y.); *J. T. Stewart*, in swamp, near Charleston, South Carolina, 1865 (Field); ex herb. *Katherine A. Taylor*, Summerville, South Carolina (Pom.).

Passes into *C. longifolia* and apparently also into *C. Linifolia*.

107. **Coreopsis Helianthoides** Beadle, Bot. Gaz. 25: 448. 1898 (non *C. Helianthoides* Forst. Prodr. 91, num. 543. 1786; nomen subnudum).

Herba perennis, erecta, pallida, 5–12 dm. alta, caulibus glabris, plus minusve teretibus, summam versus erecto-ramosis. Folia alterna, moderate adpresso-hispida setis pluriloculatis, marginibus scariosae, apice obtusae vel acutae, inferiora longe petiolata petiolis glabratis conduplicatis saepius 0.5–1.5 dm. longis, lamina (saepe rhomboide vel oblonge) ovata vel ovato-lanceolata 6–13 cm. longa et 2–6 cm. lata; superiora abrupte minora, sessilia, elliptico-oblonga vel linearia. Capitula pauca, corymbosa, tenuiter pedunculata pedunculis ±1 dm. longis, radiata, pansa ad anthesin 3–4.5 cm. lata et 7–9 mm. alta. Involucri glabri bracteae exteriores 6–11, saepe subimbricatae, ovatae vel deltoideo-lanceolatae, tergo longitudinaliter pluristriatae, basi plus minusve subauriculatae, lateribus subdiaphanae, apice obtusae, plerumque 1–5 mm. longae; interiores ovatae vel interdum oblongo-lanceolatae, 8–12 mm. longae. Flores ligulati plerumque 8, flavi, ligula cuneato-obovati, apice grosse 3-lobati lobo mediano saepe emarginato, ±2 cm. longi. Paleae tenuiter oblongo-lineares, ±4–5 mm. longae. Flores tubulosi corolla atropurpurea, stylorum ramis apice obtuse conicis. Achaenia oblonge oblanceolata vel obovata, valde obcompressa, subnigra, faciebus glaberrima, marginibus subregulariter pectinato-alata dentibus brevibus longitudine circ. 0.1–0.2 corporis latitudinis aequantibus, circ. 3 mm. longa, apice brevissime biaristata.

Type specimen: Collected by *Alvin Wentworth Chapman*, Aspalaga, Florida, October, 1897. Herbarium not cited but presumably was the Biltmore Herbarium. The Chapman specimen No. 2066c in Herb. N. Y. had been distributed from the Biltmore Herbarium.

Distribution: North Carolina southward to Florida and Alabama.

Specimens examined: Ex *Biltmore Herb. 2139*, Thomasville, Georgia, September 21, 1901 (N.Y.); *William M. Canby*, near Wilmington, North Carolina, October, 1867 (Field; Mo.; N.Y.); *A. W. Chapman*, Aspalaga, Florida, 1897 (U.S.); ex. herb. *eiusdem 2066b*, low pine barrens, Apalachicola, Florida, September 22, 1879 (Gray); (ex *Biltmore Herb.*) ex *eodem herb. 2066c*, eodem loco, October, 1897 (N.Y.; undoubtedly cotype material); *A. H. Curtiss 1477* pro parte, pine barrens, near Jacksonville, Florida, November (Berl.; Field; Mo.; U.S.); *idem 4487*, near Jacksonville, Florida, October 21, 1893 (N.Y.; U.S.); *idem 5348* pro parte, thickets bordering swamps, eodem loco, October 22, 1894 (Field; N.Y., 2 sheets; U.S., 2 sheets); *idem 10223*, Chattahooche, Florida, October, 1875 (Mo.); *A. Cuthbert*, peat bog, Augusta, Georgia, September 25, 1898 (N.Y.); *Roland M. Harper 653*, alt. 90 meters, sandy bog just southeast of Americus, Georgia, September 15, 1900 (N.Y.); *idem 1666* p.p., wet barrens north of Moultrie, Georgia, September 24, 1902 (Gray; N.Y.); *Charles Mohr*, below lake, pine barren swamp, Yellow Pine, Alabama, August 8, 1895 (U.S.); *J. B. Norton*, swamp near mouth of Kilgore Branch, east of Hartsville, South Carolina, November 5, 1921 (U.S.); *H. Ravenel*, damp pine land, Santee Canal, South Carolina, September (Gray); *F. Rugel 570* pro parte, Florida, 1845 (Field); *John Donnell Smith*, swampy woods, Columbia, South Carolina, September, 1883 (Field, 2 sheets); *idem 2028*, swampy woods 4 miles northeast of Columbia, September 25, 1883 (Field; Gray; U.S., 2 sheets); *Taylor*, Thomasville, Georgia, September 30, 1903 (Gray); *Otto Vesterland*, Marion County, Florida, November, 1889 (U.S.).

108. **Coreopsis integrifolia** Poir. Encycl. Suppl. 2: 353. 1811.

Herba perennis, erecta, gracilis, 6–9 dm. alta, caule glabro, tereti vel subangulato, subsimplici, fere omnino folioso. Folia opposita, petiolata petiolis hispido-ciliatis usque ad 3 cm. longis (vel summa sessilia); laminis diverse ovalia vel ovata vel suboblonga, crassiuscula, utrinque acuta vel subobtusa, marginibus venisque saltem primo hispida aliter glabra, 1–4 cm. longa, majora 1.5–2 cm. lata. Capitula pauca, tenuiter pedunculata pedunculis glabratis ±1 dm. longis, radiata, pansa ad anthesin 2.5–4 cm. lata et ±9 mm. alta. Involucri bracteae exteriores ±6, lineari-oblongae, ciliatae, obtusae, demum patentes vel reflexae, 2–4 (–6 ?) mm. longae; interiores ovatae 4–8 mm. longae. Flores ligulati plerumque 8, flavi, ligula cuneato-obovati, apice 3-lobati, 1–1.5 cm. longi. Paleae tenuiter lineari-oblongae. Florum tubulosorum stylorum rami

apice obtusissime brevi-conici. Achaenia non visa. Ovaria plana, subalata, biaristata aristis nudis.

Type specimen: Collected by *Bosc* in Carolina (Par.?).

Distribution: South Carolina and Georgia, also (fide F. E. Boynt. in Small Fl. S. E. United States 1279. 1903) in Florida.

Specimens examined: *Biltmore Herb. 14759a*, low, flat land along St. Mary's River, Folkston, Georgia, August 27, 1904 (N.Y.); *A. W. Chapman*, banks of Spring-brook, Decatur County, Georgia (N.Y.); *Ravenel*, damp, rich soils, Santee Canal, South Carolina, September (Gray). In addition, I have seen the fragment (Gray) obtained by Asa Gray at the DeCandolle Herbarium, doubtless from a cotype specimen.

A species very rare in herbaria and imperfectly known as to fruiting characters. Boynton (loc. cit.) classes it, in his key, with the species having achenial margins fimbriate or dissected-winged. His specific description (p. 1279) omits, however, all reference to achenes.

109. **Coreopsis nudata** Nutt. Gen. N. Amer. Pl. 2: 180. 1818; Hook. f. Bot. Mag. *pl. 6419*. 1929. *Calliopsis nudata* (Nutt.) Spreng. Syst. Veg. 3: 611. 1826. *Conopsis nudata* Nutt. ex Less. Syn. Gen. Compos. 228. 1832 (sphalm).

Herba perennis, glaberrima, 6–12 dm. alta, caulibus e radice fere tuberosa erectis, teretibus, flexuosis, summam versus corymbose pauciramosis, internodiis elongatis. Folia alterna, simplicia, anguste linearia, plus minusve teretia et juncoidea, basalia elongatissima saepe 3–4 dm. longa, mediana superioraque ±1 dm. longa, summa subulata ±1 cm. longa. Capitula pauca, radiata, longe tenuiterque pedunculata, pansa ad anthesin 4–6 cm. lata et circ. 7–8 mm. alta. Involucri bracteae exteriores 6–9, plus minusve irregulariter positae, lanceolatae, medio longitudinaliter vittatae, marginibus diaphanae, basi subauriculatae, tergo saepe subscabridae, 2–4 mm. longae; interiores ovatae, saepe subscabridae, 7–10 mm. longae. Flores ligulati circ. 8, rosei, obovato-cuneati, apice 3-lobati lobis lateralibus rotundatis mediano plerumque multo majore truncato vel emarginato, 1.5–2.2 cm. longi. Paleae late lineari-oblongae, apice subacutae, circ. 5–6 mm. longae. Flores tubulosi corolla flavidi, stylorum ramis obtuse truncato-conicis. Achaenia subplana oblonga, faciebus nigra, marginibus irregulariter pectinato-dentata dentibus saepe 2–4-congregatis subbrunneis plus minusve planis apice obtusissimis quam corporis diametro saltem dimidio brevioribus, corpore circ.

2.5–3.1 mm. longa et (dentibus lateralibus inclusis) 1–1.4 mm. lata, apice biaristata (aristis linearibus stramineis antrorsum hispidis 0.6–1 mm. longis) atque inter aristas poculo minuto centrali coronata.

Type specimen: Collected by *William Baldwin*, near St. Mary's, "west Florida."

Distribution: Southern Georgia and northernmost Florida.

Specimens examined: *Biltmore Herb. 2070b*, bordering pond in pine barrens, near Apalachicola, Florida, April 14, 1894 (Gray); *A. W. Chapman*, Apalachicola, Florida (Gray; N.Y., 2 sheets); herb. *eiusdem 2070b*, bordering ponds in pine barrens, near Apalachicola, Florida, April 14, 1894 (Field; N.Y.; cf. *Biltmore Herb. 2070b*); *A. H. Curtiss 1484*, pine barren swamps, near Jacksonville, Florida, May (Berl.; Field, 3 sheets; Gray); *idem 4488*, near Jacksonville, April 29, 1893 (N.Y.); *idem 4713*, swampy places in pine barrens, near Jacksonville, April 21, 1894 (Field; Gray); *Asa Gray*, Apalachicola, Florida, April, 1875 (Gray); *Roland M. Harper 1001*, alt. 70 meters, wet pine barrens near Collins, Georgia, July 4, 1901 (Berl.; Gray; N.Y.); *idem 2198*, cypress pond near Douglas, Coffee County, Georgia, May 11, 1904 (Berl.; Gray; N.Y.); *Albert S. Hitchcock*, Jacksonville, Florida (Field); *B. F. Saurman*, wet pine barrens, Apalachicola, Florida (Field); *John K. Small, John B. DeWinkeler, & Charles A. Mosier 11252*, Apalachicola prairies, Florida, April 25, 1924 (N.Y.); *John Donnell Smith*, near Starke, Florida, April 9, 1880 (Field); *C. S. Williamson*, Waycross, Georgia, April 15 (N.Y.).

110. **Coreopsis Mildbraedii** Muschler, Wiss. Ergebn. Deutsch. Zentr. Afr.-Exped. 1907–1908, 2: 381. 1911.

Herba perennis vel suffruticosa, erecta, 1–1.5 m. alta; caulibus ramisque subhirtis vel deinde mox glabratis glaberrimisve, striato-sulcatis, teretibus, plus minusve ochraceis. Folia opposita petiolata petiolis concavis basi subvaginatis et linea prominente ad medium adpresse retrorsumque hirsuta conjunctis usque ad 2 cm. longis, petiolo adjecto 8–17 cm. longa, semel bis vel terne pinnatisecta, segmentis principalibus circumambitu ovatis vel rhomboideo-lanceolatis, faciebus dense glanduloso-punctulatis sed glabratis, marginibus ciliatis ac perspicuissime dentatis (dentibus elongatis saepius lineari-lanceolatis apicaliter acerrimis saepe 1–1.5 cm. longis) apice acerrime elongato-acuminatis. Capitula subnumerosa, tenuiter pedicellata pedicellis (1–3-bracteatis vix ultra 0.75 mm. crassis, infra glabris supra hispidis) saepius 4–12 cm. longis, radiata,

pansa ad anthesin ±4.5 cm. lata et 11 mm. alta. Involucri bracteae exteriores (1–3 proximae vere pedicella genitae exclusae) circ. 6–9, virides, elongato-lineares, dorso glabratae, marginibus infra plerumque glabratae supra spinuloso-ciliatae, apice induratae, saepius 1.3–1.8 cm. longae et circ. 1.5 mm. latae; interiores ovatae, marginaliter diaphano-flavae alibi intense purpurascenti-atrae, tergo pubescentes, apice pulverulentae, tantum 5–8 mm. longae. Flores ligulati verisimiliter 8–10, flavi, ligula elliptico-oblanceolati, apice minute denticulati, circ. 2 cm. longi et 4–6 mm. lati. Paleae oblongo-lineares, pluristriatae, apice saepe subabrupte acutae, 6–8 mm. longae. Disci florum stigmata terminaliter elongato-caudata. Achaenia obovato-oblonga vel lineari-oblonga, obcompressa, apicem versus rarius contracta, atra, unaquaque facierum circ. 8-sulcata et sparsim erecto-setosa, marginibus anguste alata alis brunneis antrorsum setosis, corpore ipso 4.5–6 mm. longa et 1.5–2 mm. lata, apice dense breviterque erecto-setoso biaristata aristis erectis tenuibus sursum hispidis 1–2.5 mm. longis.

Type specimen: Collected by *Mildbraed* (Exped. d. *Herzogs Ad. Friedr. z. Mecklenburg* Afr. 1907–1908), No. 2539, growing 1–1.5 meters high at altitude of 3,000 meters, at edge of mountain forest and near the *Ericaceae*, Butagu Valley, Ruwenzori West, Belgian Congo, middle of February, 1908 (Berl.).

Distribution: Known only from type locality in Belgian Congo.

Specimens examined: *Jean Lebrun 4507*, alt. 2,475 meters, Valley of the Nyamuwamba, Ruwenzori, Belgian Congo, November, 1931 (Mus. Cong., 2 sheets); *Mildbraed 2539* (type, Berl.).

The achene wings are narrow and thickish, offering an approach to *Bidens*. The species is at once distinguished from all other species in both *Bidens* and *Coreopsis* by its (sharply cut) foliage. The exceptionally elongate exterior involucral bracts are an additional aid in identification. Lebrun's label describes the plant as having a strong odor of tansy (*Tanacetum vulgare* L.).

111. **Coreopsis bracteosa** Sherff, Bot. Gaz. 76: 88. 1923.

Herba glabra, verisimiliter perennis et 7–10 dm. alta, caulis internodiis folia superantibus, mediis inferioribusque saltem 18–22 cm. longis. Folia sessilia, indivisa, linearia, 6–20 cm. longa et 4–10 mm. lata, in apicem acutum sensim angustata, sparsim dentata dentibus saepe ad spinas vel etiam ad pilos spinulosos flexiles reductis, margine revoluta et interdum minutissime spinuloso-ciliata. Capitula pedunculata pedunculis maximam partem glabris usque ad

5 cm. longis, radiata, pansa ad anthesin 3.5–4.5 cm. lata et 6–9 mm. alta. Involucri bracteae exteriores numerosae 19–21, anguste lineares, margine spinuloso-ciliatae, aliter glabrae, apice acerrime apiculatae, 1–1.7 cm. longae, interioribus lanceolatis dorso hispidis (pilis inferne squamellato-dilatatis) plerumque dimidio longiores. Flores ligulati circ. 12, ligula elliptici, lutei, apice denticulati, circ. 1.7–2 cm. longi et 5–7 mm. lati. Paleae oblongo-lanceolatae, apice subito angustatae, costa mediana brunnea perspicua. Disci florum stigmata caudato-apiculata. Achaenia atra, linearia vel oblonga, valde obcompressa, plerumque alata, margine et supra ad faciem sursum hispida, corpore circ. 4–5 mm. longa et (alis inclusis) 1–1.5 mm. lata, biaristata aristis antrorsum hispidis 0.6–3 mm. longis. Planta *Bidenti chaetodontae* Sherff affinis sed foliis indivisis non pinnatipartitis, involucri bracteis exterioribus 19–21 non tantum 12, achaeniis plerumque alatis non exalatis, etc. differt.

Type specimen: Collected by *Hans Meyer*, No. 532, at altitude of 1,200–1,400 meters, bush and tree-grass-steppe, Jhangiro and Karagwe, German East Africa, summer of 1911 (Berl.).

Distribution: British and German East Africa.

Specimens examined: *Meyer 532* (type, Berl.); *A. Whyte*, on 5th march from Nandi to Kagamagas, Tropical East Africa, 1898 (Kew).

112. **Coreopsis Prestinaria** Schz. Bip. in Walpers, Repert. 6: 163. 1846. *Prestinaria Bidentoides* Schz. Bip. loc. cit. *Verbesina veris* A. Richard, Tent. Fl. Abyssin. 1: 407. 1847. *C. Prestinaria* f. *typica* Vatke and f. *latisecta* Vatke, Linnaea 39: 498. 1875.

Herba annua, subglabra, erecta, 2–6 dm. alta, ramis tenuibus saepe subnumerosis. Folia opposita, inferiora (ac interdum mediana) tenuiter petiolata petiolis saepius glabratis usque ad 2 cm. longis, superiora (ac plerumque mediana) breviter alato-petiolata vel subsessilia, omnia 3–6 cm. longa, circumambitu triangulata vel ovato-triangulata, bipinnatisecta, lobis membranaceis linearibus vel oblongo-lanceolatis glabris vel aegre ciliatis apice calloso-mucronatis. Capitula tenuiter pedicellata pedicellis usque ad 6 cm. longis, subnumerosa, radiata, pansa ad anthesin 2–3 cm. lata et circ. 8 mm. alta. Involucri glabri bracteae exteriores 8–10, uniseriales, lineares vel lineari-spathulatae, trinerviae, calloso-apiculatae, circ. 6 mm. longae; interiores oblongo-lanceolatae, badiae, margine diaphanae, saepe paulo longiores. Flores ligulati circ. 8, flavi, ligula lineari-elliptici, apice integri, circ. 1–1.4 cm. longi et 3–4 mm. lati. Paleae

anguste oblongae, nitidae, paucistriatae, usque ad circ. 12 mm. longae et circ. 1.5 mm. latae. Disci florum stigmata tenuia terminaliter angustata. Achaenia obcompressa, corpore lineari-fusiformia vel lineari-clavata nigra faciebus adpresse erecteque papillato-setosa 6–9 mm. longa et 0.9–1.1 mm. lata, lateraliter alata alis angustis stramineis vel subbadiis superne 0.3–0.5 mm. latis marginibus exterioribus erecto-ciliatis, apice erecto-setosa et biaristata aristis subulatis stramineis antrorsum hispidulis 4–6 mm. longis.

Type specimen: Collected by *Wilhelm Schimper*, No. 62, near Djeladjeranne (Dscheladscheranne), Abyssinia, 1840 (Par.; nomen vulg., Gellgelle Maskal).

Distribution: Abyssinia.

Specimens examined: *J. M. Hildebrandt 417*, during rainy season, September, 1872 (Berl.); *A. Petit*, Abyssinia (Berl., 3 sheets; Par., 3 sheets); *Quartin Dillon 612*, Abyssinia, November, 1840 (Par., 2 sheets); *Schimper 62* (type, Par.; cotypes, Berl., 4 sheets; Gray; N.Y.; Par., 2 sheets); *idem 429*, mountains and valleys at 1,860 meters alt., Gowwo Soria, Tigre, Abyssinia, September 26, 1862 (Berl., 2 sheets; type collection of f. *latisecta* Vatke); *H. Steudner 349*, Keren, etc., Tigre, Abyssinia (Berl.; nom. tigrense, Adé).

Often confused with *C. macrantha* but easily distinguished by its annual habit, lower stature, smaller flowering heads, smooth inner involucral bracts, more narrowly winged achenes, etc. The f. *latisecta* Vatke has leaf divisions slightly wider than in the type specimens but apparently is only a robust state of the species.

Vatke (loc. cit.) confused *C. macrantha* with this species, as is shown by his inclusion of *Schimper 71* and *1423* under *C. Prestinaria*. Oliver and Hiern (in Oliv. Fl. Trop. Afr. 3: 387. 1877) stated incorrectly that the aristae exceeded the achene in length. Seldom do they even equal it, although the coincidence of certain aristae with others underneath in a mature fruiting head often gives an exaggerated effect to the aristal length.

The native names recorded by Schimper and others for this and closely similar species are: Gellgelle Maskal (Schimp.; spelled Gueulguel-Makhul, A. Rich. loc. cit.); Adé (Steudner; spelled Addé, A. Rich. loc. cit.); Embobahgadé (A. Rich. loc. cit.).

113. **Coreopsis macrantha** Schz. Bip. in Walpers, Repert. 6: 163. 1846. *Verbesina macrantha* (Schz. Bip.) A. Rich. Tent. Fl. Abyssin. 1: 408. 1847. *C. macroptera* Schz. Bip. ex Schweinf. & Aschers. in Schweinf. Beitr. Fl. Aethiop. 284. 1867 (nomen subnudum);

cf. Pirotta, Fl. Della Colonia Eritrea 1: 184. 1904. *C. Prestinaria* f. *elatior* Vatke, Linnaea 39: 498. 1875 (excl. Schimperi plantam n. 22). *Prestinaria macrantha* Schz. Bip. ex O. & H. in Oliver, Fl. Trop. Afr. 3: 391. 1877.

Herba perennis, adscendenti-erecta e radice lignescenti fibrosa multicauli, 3–15 dm. alta, caulibus subtetragonis vel subteretibus, glabris, internodiis quam foliis saepius multo longioribus. Folia opposita, plerumque breviter petiolata petiolis glabris late alato-marginatis tantum 2–8 mm. longis, petiolo adjecto 3–8 cm. longa, bipinnatisecta, lobis linearibus glabris membranaceis, corpusculo subcorneo terminatis, saepius 1.5–4 mm. latis. Capitula tenuiter pedicellata pedicellis glaberrimis usque ad 18 cm. longis, radiata, pansa ad anthesin 3–4 (–5) cm. lata et 8–13 mm. alta. Involucri bracteae subaequilongae, exteriores 9–13 saepe subbiseriales, lanceolato-lineares vel rarius anguste lineares, 3-(vel sub 5-) nerviae, omnino virides vel marginibus angustis albescentes, glabrae, apice subabrupte acutae, circ. 8–13 (rarius –18) mm. longae; interiores oblongo-lanceolatae, coloratae, marginibus diaphanae, ad tergi costam medianam hispido-fimbriatae. Flores ligulati circ. 8–10 (12 fide Schultzii), flavi, ligula ovato-oblongi, apice minute denticulati, 1.7–2.5 cm. longi et 5–10 mm. lati. Paleae lineari-oblongae, glabrae, 1–1.4 cm. longae. Disci florum stigmata caudato-appendiculati. Achaenia plana, corpore nigra anguste lineari-oblonga adpresse erecto-setosa 6–8 (–13) mm. longa et 0.9–1.2 mm. lata; margine moderate vel latissime alata alis hispidis et densissime erecto-ciliatis supra interdum 2–4 mm. latis; apice setis numerosis albescentibus erectis nitidis elongatis ac 2 aristis erectis subulatis stramineis antrorsum hispidis 3–7 mm. longis coronata.

Type specimen: Collected by *Wilhelm Schimper* (sect. 2, No. 1236, Enschedcap, Abyssinia (Par.).

Distribution: Eritrea and Abyssinia.

Specimens examined: *Anon.*, cult. in Hort. Berol., 1860 (Berl.; Par.); *Antinori*, Province of Scioa (Shoa), Abyssinia, 1878 (Flor.); *Emilio Chiovenda*, District of Semien, Province of Amhara, Abyssinia, December 3, 1909 (Flor.); *idem 1820*, District of Dembià (Dembea), Province of Amhara, September 3, 1909 (Flor.); *idem 2205*, Gondar, Province of Amhara, September 25, 1909 (Flor.); *Quartin Dillon*, Abyssinia (Par.); *Ellenbeck* (Exped. *Baron von Erlanger*) *1660*, alt. 3,500 meters, Schoa, Province of Schoa (Shoa), Abyssinia, November 16, 1900 (Berl.); *Adriano Fiori 1826*, alt. 2,000 meters, Hamasen region, Eritrea, April 1, 1909 (Flor.); *G. Negri 56*, Province

of Scioa, Abyssinia, 1909 (Flor.); *idem 235 bis*, eodem loco et tempore (Flor.); *idem 618*, alt. 2,650 meters, eodem loco (Flor.); *O. Neumann 75*, alt. 1,800–2,300 meters, between Kontschu and Tomata (Gudji), Abyssinia, December 24, 1900 (Berl.; forma involucro exteriore *C. Prestinariae* adpropinquans); *A. Pappi 1194*, alt. 2,800–3,000 meters, toward the Torrent of Arigot, Mount Mamahot, Soyrà Mountains, August 23, 1902 (Flor.); *idem 1303*, alt. 2,600–2,800 meters, Torrent of Arigot, Soyrà Mountains, Oculé Cusae, Eritrea, August 23, 1902 (Flor.); *idem 2642*, Eritrea, July 14–15, 1902 (Flor.); *A. Petit*, Abyssinia (Berl., 2 sheets); *V. Ragazzi*, Antoto, Province of Scioa, October 2, 1887 (Flor.); *idem*, Let-Marefia, Province of Scioa, September 4, 1886 (Flor.); *idem*, eodem loco, September 6, 1886 (Flor.); *idem 250*, alt. 2,000 meters, Amasen Quazien west of Dorfu, Eritrea, September, 1892 (Flor.); *Rohlfs & Stecker*, alt. 2,450 meters, Katz, Abyssinia, December 30, 1880 (Berl., 2 sheets); *Rüppell*, between Temben and Siemen, Abyssinia, June or July, 1832 (Par.); *W. Schimper* (itin. abyssin. sect. 5. n. 22, edit. Buchinger, 1854), Abyssinia (Berl.; Del.; Kew; Par., 3 sheets; type material of *Coreopsis macroptera* Schz. Bip.); *idem 48*, in fields, alt. 2,790 meters, Dibra Eski (Siemen), Abyssinia, November 6, 1850 (Par., 2 sheets; "blooming in August and September"); *idem 71*, alt. 1,890 meters, mountains and valleys, Mai Sigamo, Abyssinia, September 26, 1862 (Berl., 3 sheets); *idem 85*, Abyssinia (Par.); *idem* (itin. abyssin. sect. 5. n. 95, edit. Buchinger, 1854), Abyssinia (Par.); *idem* (itin. abyssin. sect. 5. n. 1005, edit. Buchinger, 1854), Province of Agow, Abyssinia, 1853 (Par., 3 sheets); *idem 1236* (type, Par.; cotypes, Berl., 2 sheets; N.Y.; Par.); *idem 1423*, alt. 3,150 meters, Mount Gunna, Abyssinia, December 18, 1863 (Berl.; Kew); *Hugh Scott*, alt. 2,700–2,900 meters, Mount Zuguala, Abyssinia, October 21–27, 1926 (Kew); *H. Steudner 253*, Province of Amhara, May 20, 1862 (Berl.); *A. Terracciano & A. Pappi 2474*, alt. about 2,000 meters, Alibaret-Sella Mogasas, Bogos, Eritrea, February 5, 1893 (Flor.).

Vatke (loc. cit.) appears to have completely ignored the perennial habit and proportionately shorter achaenial aristae of this species. He merged it (as f. *elatior*) with *C. Prestinaria*, a course not followed by Oliver and Hiern, or by Otto Hoffmann, or by other subsequent students of the group.

C. macroptera was known to Oliver and Hiern (in Oliv. Fl. Trop. Afr. 3: 391. 1877) only through achenes, and they referred it interrogatively to *C. macrantha* Schz. Bip. Schultz Bipontinus' private

herbarium (Par.) contains several sheets of excellent material labeled *C. macroptera* in his own writing. These, also several found elsewhere under his determination *C. macroptera*, have thicker and taller stems, mostly different leaves, mostly larger capitula with the larger, exterior bracts mostly more numerous and with their margins more conspicuously whitish, etc. (Folia subsessilia, 4–8 cm. longa, nunc bipinnatisecta lobis linearibus acriter apiculatis 1.5–5 mm. latis, nunc anguste oblongo-lanceolata lamina ipsa 1–1.5 cm. lata marginibus dentibus vel lobis linearibus perspicuissime elongatis [etiam 4.5 cm. longis] munita.) But a study of numerous other specimens more recently collected, especially by various Italian collectors, shows all intergradations, unless as to foliage. (In *C. macroptera* some of the principal leaves appeared to have a petiole and midrib grossly expanded into an abnormal blade, this irregularly toothed with greatly elongate, linear lobes. The appearance was unnatural and apparently teratological. However, we may consider this character as of no important value, since *C. Prestinaria* is known to produce at times a precisely comparable leaf-form.—Moreover, it may be noted that some authors who have retained *C. macroptera* have overlooked even this one seeming distinction. Thus R. Pirotta [Fl. Della Colonia Eritrea 1: 184. 1904] lists *C. macroptera* and cites for it *Terracciano & Pappi 2474*, a plant which is typical *C. macrantha*.)

114. **Coreopsis pachyloma** O. & H. in Oliver, Fl. Trop. Afr. 3: 391. 1877. *C. involucrata* Schz. Bip. in Walpers, Repert. 6: 163. 1846 (non Nutt. Journ. Acad. Phila. 7: 74. 1834). *Verbesina involucrata* (Schz. Bip.) A. Rich. Tent. Fl. Abyssin. 1: 409. 1847. *C. callosa* Schz. Bip. in Schweinf. & Aschers. Enum. 284. 1867.

Achaenia biaristata.....*C. pachyloma* sensu stricto.
Achaenia exaristata.....var. *β inanis*.

Herba annua, erecta vel adscendens, ramosa, 3–7 dm. alta; caule ramisque (siccis) viridi-stramineis, perspicue striatis, nunc glabratis nunc hispidis, nitidis. Folia opposita tenuiter petiolata petiolis basaliter connatis interdum hispidis usque ad 2 cm. longis, petiolo adjecto usque ad 6 cm. longa, circumambitu late oblonga vel deltoideo-ovata, bipinnatipartita, lobis valde membranaceis, nervis marginibusque subsparsim setosis, saepe 1 vel 2 dentibus acriter serratis, abrupte mucronulatis, saepius 2–4 mm. latis. Capitula subcorymbosa, pedunculata pedunculis tenuibus hispidis 5–14 cm. longis, radiata, pansa ad anthesin circ. 2 cm. lata et 6–8 mm. alta. Involucri bracteae exteriores circ. 8, lineari-spathulatae, valde foliaceae, facie-

bus glabrae vel raro subhispidae, marginibus hispido-ciliatae, apice acuto vel subobtuso flavido-albidae ac cartilagineo-induratae, 7–12 mm. longae et superne 1–2.5 mm. latae: interiores ovato-oblongae dorso hispidae saepe paulo vel etiam fere dimidio breviores. Flores ligulati 6–8, flavi, ligula elliptico-oblanceolati, 6–12-striati, apice integri vel denticulati, 8–10 mm. longi et 3–5 mm. lati. Paleae subalbidae convexe conduplicatae, acutae, 7–9 mm. longae. Disci florum stigmata terminaliter caudata. Achaenia corpore ipso dorsaliter lineari-oblanceolata, moderate obcompressa, nigra (nitida), glabra vel supra erecto-setosa, 4.5–5.5 mm. longa et dorsaliter fere 1 mm. lata, lateraliter alis stramineis crassis erecte hispidis marginaliter rotundatis ventraliter fere 0.5 mm. latis bialata, apice biaristata aristis lanceolato-subulatis, hyalinis, infra valde membranaceis supra rigidis acerrimisque, marginibus minute erecto-ciliolatis, 4–5.5 mm. longis.

Type specimen: Collected by *Wilhelm Schimper* in Abyssinia (Kew).

Distribution: Abyssinia.

Specimens examined: *Anon.*, under bushes at Gaffat near Debra Tabor, May 10, 1862 (Berl.); *Eduard Rüppell*, between Temben and Siemen, June or July, 1832 (type of *C. involucrata* Schz. Bip., Par.); *Schimper* (itin. abyssin.) sect. 5. nos. *15* (Del.; Par.) and *933* (Par.).

An annual with the foliar habit of *Bidens pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff. The achenial characters separate it at once from other species of *Coreopsis*.

Coreopsis pachyloma var. *β* **inanis** Sherff, Bot. Gaz. 90: 386. 1930.

A specie achaeniis etiam primo exaristatis differt.

Type specimen: Collected by *Wilhelm Schimper*, No. 933 pro parte, Abyssinia, commun. 1853 (Par.).

Distribution: Abyssinia.

Specimen examined: *Schimper 933* pro parte (type, Par.).

PLANTAE EXCLUSAE

Coreopsis abyssinica Schz. Bip. ex Walp. Repert. 6: 163. 1846= *Bidens chaetodonta* Sherff, Bot. Gaz. 90: 387. 1930.

Coreopsis abyssinica var. *bipinnato-partita* Chiov. in Pirotta, Fl. Colon. Eritrea 185. 1904=*Bidens setigera* (Schz. Bip.) Sherff, op. cit. 90: 390. 1930.

Coreopsis abyssinica var. *glabrior* O. & H. in Oliv. Fl. Trop. Afr. 3: 389. 1877=*Bidens chaetodonta* var. *glabrior* (O. & H. in Oliv.) Sherff, op. cit. 90: 388. 1930.

Coreopsis abyssinica f. *latisecta* Vatke, Linnaea 39: 499. 1875 (nom. subnudum)=*Bidens articulata* Sherff, op. cit. 94: 591. 1932.

Coreopsis Acmella (L.) E. H. L. Krause, Beih. Bot. Centralbl. 32, pt. 2: 340. 1914=*Spilanthes Acmella* (L.) Murr. Syst. Veg. ed. 13. 610. 1774.

Coreopsis Acmella var. *uliginosa* E. H. L. Krause, loc. cit.= *Spilanthes uliginosa* Swartz, Prodr. Veg. Ind. Occ. 110. 1788.

Coreopsis alata Cav. Icon. et Descr. 3: 30, *pl. 260.* 1795=*Verbesina occidentalis* (L.) Walt. Fl. Carol. 213. 1788.

Coreopsis alba L. Sp. Pl. 908. 1753.=*Bidens pilosa* var. *radiata* f. *Dondiaefolia* (Less.) Sherff, Bot. Gaz. 97: 607. 1936.

Coreopsis alternifolia L. op. cit. 909. 1753=*Actinomeris alternifolia* (L.) DC. Prodr. 5: 575. 1836.

Coreopsis ambacensis Hiern, Cat. Welw. Afr. Pl. 1, pt. 3: 586. 1898=*Bidens ambacensis* (Hiern) Sherff, Bot. Gaz. 59: 309. 1915.

Coreopsis ambigua Nutt. Journ. Acad. Phila. 7: 75. 1834=*Bidens mitis* (Michx.) Sherff, op. cit. 81: 43. 1926.

Coreopsis amplexicaulis Cav. Descr. 226. 1802=*Simsia foetida* (Cav.) Blake, Proc. Amer. Acad. n. ser. 41: 385. 1913.

Coreopsis Anagallis E. H. L. Krause, Beih. Bot. Centralbl. 32, pt. 2: 344. 1914=*Enhydra Anagallis* Gardn. Lond. Journ. Bot. 7: 409. 1848.

Coreopsis Anthemoides DC. Prodr. 5: 573. 1836=*Bidens Anthemoides* (DC.) Sherff, Bot. Gaz. 56: 493. 1913.

Coreopsis arenicola S. L. Moore, Journ. Linn. Soc. 37: 170. 1905= *Bidens musoziana* Sherff, op. cit. 59: 309. 1915.

Coreopsis arguta Pursh, Fl. Amer. Sept. 2: 567. 1814=*Bidens mitis* (Michx.) Sherff, op. cit. 81: 43. 1926.

Coreopsis aristata Willd. Sp. Pl. 3: 2253. 1804=*Bidens aristosa* (Michx.) Britt. Bull. Torr. Bot. Club 20: 281. 1893.

Coreopsis aristosa Michx. Fl. Bor. Amer. 2: 140. 1803=*Bidens aristosa* (Michx.) Britt. loc. cit.

Coreopsis aristosa var. *mutica* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 295. 1884=*Bidens aristosa* var. *mutica* A. Gray ex Gattinger, Fl. Tenn. 172. 1901.

Coreopsis arizonica (A. Gray) O. Hoffm. in Engl. & Prantl, Nat. Pflanzenf. 4, pt. 5: 243. 1890=*Coreocarpus arizonica* (A. Gray) Blake, Proc. Amer. Acad. n. ser. 49: 344. 1913.

Coreopsis Artemisiaefolia Jacq. Icon. Pl. Rar. 3: *pl. 595.* 1786–1793; Coll. Suppl. 155. 1796=*Cosmos sulphureus* Cav. Icon. et Descr. 1: 56. *pl. 79.* 1791.

Coreopsis Artemisifolia Sessé & Moc. Fl. Nov. Hispan. ed. 2. 137. 1893=*Cosmos sulphureus* Cav. loc. cit.

Coreopsis asperata Hutch. & Dalz. Fl. West Trop. Afr. 2: 141–143. 1931; cf. Sherff, Bot. Gaz. 93: 219. 1932=*Bidens asperata* (Hutch. & Dalz.) Sherff, loc. cit. 93: 220. 1932.

Coreopsis Aspilioides Bak. Kew Bull. 153. 1898=*Bidens Aspilioides* (Bak.) Sherff, op. cit. 94: 590. 1932.

Coreopsis aurea Dryand. in Ait. Hort. Kew. ed. 1, 3: 252. 1789=*Bidens aurea* (Dryand. in Ait.) Sherff, op. cit. 59: 313. 1915.

Coreopsis Bacana Heyne ex DC. Prodr. 5: 632. 1836=*Glossogyne pinnatifida* (Buch.-Ham. in Wall.) DC. in Wight, Contr. 19. 1834.

Coreopsis baccata L. Pl. Surin. 14. 1775; Amoen. Acad. 8: 262. 1785=*Wulffia stenoglossa* DC. 5: 563. 1836.

Coreopsis Baumii O. Hoffm. in H. Baum, Warb. Kunene-Zambesi Exped. 419. 1903=*Bidens Baumii* (O. Hoffm.) Sherff, Bot. Gaz. 59: 309. 1915.

Coreopsis Bidens L. Sp. Pl. 908. 1753=*Bidens cernua* L. op. cit. 832.

Coreopsis Bidentoides Nutt. ex Torr. & Gray, Fl. N. Amer. 2: 339. 1843=*Bidens Bidentoides* (Nutt.) Britt. Bull. Torr. Bot. Club 20: 281. 1893.

Coreopsis biternata Lour. Fl. Cochinch. ed. 1. 508. 1790=*Bidens biternata* (Lour.) Merr. & Sherff ex Sherff, Bot. Gaz. 88: 293. 1929.

Coreopsis Buchingeri Schz. Bip. in Schweinf. & Aschers. Enum. 284, nomen=*Bidens rotata* Sherff, op. cit. 90: 391. 1930.

Coreopsis Buchneri Klatt, Leopoldina 25: 107. 1889=*Bidens Buchneri* (Klatt) Sherff, op. cit. 76: 158. 1923.

Coreopsis Buchneri Klatt, Ann. Naturh. Hofmus. Wien 7: 103. 1892=*Bidens grandis* Sherff, op. cit. 59: 309. 1915.

Coreopsis chrysantha Vatke, Linnaea 39: 499. 1875=*Bidens Vatkei* Sherff, op. cit. 90: 388. 1930.

Coreopsis chrysantha var. *simplicifolia* Vatke, op. cit. 500=*Bidens Dielsii* Sherff, op. cit. 90: 388. 1930.

Coreopsis cordifolia (Schz. Bip.) Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 208. 1890; Fl. Polyn. Franc. 109. 1892=*Bidens cordifolia* Schz. Bip. Flora 39: 361. 1856.

Coreopsis cordifolia Sessé & Moc. Pl. Nov. Hispan. ed. 2. 137. 1893=**Dahlia cardiophylla** Blake and Sherff, nom. nov.

The type is still extant (Herb. Bot. Gard. Madrid). Dr. Sidney F. Blake, Senior Botanist of the United States Bureau of Plant Industry, has independently examined it at my suggestion and writes: "I agree that it is undoubtedly a hitherto unrecognized species of *Dahlia*."

Coreopsis coriacea O. Hoffm. in Engl. Pflanzenw. Ost-Afr. C: 414. 1899=*Bidens coriacea* (O. Hoffm.) Sherff, Bot. Gaz. 81: 52. 1926.

Coreopsis corymbifolia Buch.-Ham. ex DC. Prodr. 5: 602. 1836=*Bidens pilosa* L. Sp. Pl. 832. 1753.

Coreopsis Cosmoides A. Gray, Proc. Amer. Acad. 5: 126. 1861=*Bidens Cosmoides* (A. Gray) Sherff, Bot. Gaz. 70: 98. 1922.

Coreopsis crassifolia Sessé & Moc. Fl. Mex. ed. 2. 194. 1894=*Dahlia variabilis* Desf. Cat. Hort. Par. ed. 3. 182. 1829. The Sessé & Mocino type came from mountains in Temascaltepec, State of Mexico. Its leaves are simple (although the lower ones are described as ternate). The general appearance is thus quite different from that in *Dahlia variabilis* Desf. With that species, however, it is definitely seen to belong from a study of *Pringle 3165*. The plant of this number at St. Louis (Mo.) has closely matching foliage, but the plant at Chicago (Field) has the leaves mostly 5-partite, as very commonly found in *D. variabilis*.

Coreopsis Crataegifolia O. Hoffm. Bot. Jahrb. 30: 431. 1901=*Bidens Crataegifolia* (O. Hoffm.) Sherff, op. cit. 76: 158. 1923.

Coreopsis cuspidata Bertol. Misc. Bot. 7: 44. 1848 (ex descript. et patria)=*Bidens mitis* (Michx.) Sherff, op. cit. 81: 43. 1926.

Coreopsis dichotoma Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 209. 1890 (*nec alior.*)=*Bidens Degeneri* Sherff, op. cit. 85: 3. 1928.

Coreopsis diffusa Jones, Extracts Contr. West. Bot. 18: 73. 1933=*Chrysanthellum mexicanum* Greenm. Proc. Amer. Acad. 39: 114. 1903 (forma humilis sed non aliter atypica).

Coreopsis discoidea Torr. & Gray, Fl. N. Amer. 2: 339. 1843=*Bidens discoidea* (Torr. & Gr.) Britt. Bull. Torr. Bot. Club 20: 281. 1893.

Coreopsis dissecta (Benth.) Blake ex Ind. Kew. Suppl. 5: 66. 1921 =*Coreocarpus dissectus* (Benth.) Blake, Proc. Amer. Acad. n. ser. 49: 344. 1913.

Coreopsis Elliotii S. L. Moore, Journ. Linn. Soc. 35: 346. 1902= *Bidens Elliotii* (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915.

Coreopsis exaristata O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 414. 1899=*Bidens microcarpa* Sherff, op. cit. 76: 84. 1923.

Coreopsis exaristata var. *gracilior* O. Hoffm. loc. cit.=*Bidens gracilior* (O. Hoffm.) Sherff, loc. cit. 1923.

Coreopsis Ferulaefolia Jacq. Hort. Schoenbr. 3: 65. 1798=*Bidens Ferulaefolia* (Jacq.) DC. Prodr. 5: 603. 1836.

Coreopsis filifolia Hook. Bot. Mag. *pl. 3505.* 1836=*Thelesperma filifolium* (Hook.) A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 301. 1884.

Coreopsis Fischeri O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 414. 1899=*Bidens Fischeri* (O. Hoffm.) Sherff, Bot. Gaz. 76: 158. 1923.

Coreopsis flammula Banks ex Steud. Nomencl. ed. 1. 108. 1821= *Bidens laevis* (L.) Britton, Sterns & Poggenb. Prel. Cat. 29. 1888 (fide syn. *B. Chrysanthemoidis* in Steud. loc. cit.).

Coreopsis Foeniculacea Sessé & Moc. ex DC. Prodr. 5: 603. 1836= *Bidens Ferulaefolia* var. *Foeniculaefolia* (DC.) Sherff, Bot. Gaz. 81: 39. 1926.

Coreopsis foetida Cav. Icon. et Descr. 1: 55, *pl. 77.* 1791=*Simsia foetida* (Cav.) Blake, Proc. Amer. Acad. n. ser. 41: 385. 1913.

Coreopsis formosa Bonato Pisaura autom. *Coreopsis formosa* 22, *pl. 2.* 1793=*Cosmos bipinnatus* Cav. Icon. et Descr. 1: 10, *pl. 14.* 1791.

Coreopsis frondosa O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 414. 1899=*Bidens magnifolia* Sherff, Bot. Gaz. 90: 390. 1930.

Coreopsis fruticosa Forst. Fl. Ins. Austr. Prodr. 91. 1786, nomen= *Bidens australis* Spreng. Syst. Veg. 3: 453. 1826.

Coreopsis Georgina Cass. Dict. Sci. Nat. 18: 441. 1820=*Dahlia variabilis* (Willd.) Desf. Cat. Hort. Par. ed. 3. 182. 1829.

Coreopsis Georgina var. *nuda* Cass. op. cit. 442=*Dahlia variabilis* (Willd.) Desf. loc. cit.

Coreopsis Georgina var. *pruinosa* Cass. op. cit. 443=*Dahlia variabilis* (Willd.) Desf. loc. cit.

Coreopsis glaucescens O. & H. in Oliv. Fl. Trop. Afr. 3: 389. 1877= *Bidens articulata* Sherff, Bot. Gaz. 94: 591. 1932.

Coreopsis Grantii Oliv. Trans. Linn. Soc. 29: 98. *pl 65.* 1874= *Bidens Grantii* (Oliv.) Sherff, op. cit. 59: 309. 1915.

Coreopsis hawaiensis (A. Gray) Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 209. 1890=*Bidens hawaiensis* A. Gray, Proc. Amer. Acad. 5: 128. 1861.

Coreopsis heterophylla Cav. Icon. et Descr. 3: 34, *pl. 268.* 1795; Descr. 226. 1802=*Iostephane heterophylla* (Cav.) Benth. in Benth. & Hook. Gen. Pl. 2: 368. 1873.

Coreopsis heterophylla Bertol. Misc. Bot. 7: 43. 1848 (ex descript. et patria)=*Bidens mitis* (Michx.) Sherff, Bot. Gaz. 81: 43. 1926.

Coreopsis Hillebrandiana Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 209. 1890=*Bidens Hillebrandiana* (Drake del Cast.) Deg. ex Sherff, op. cit. 85: 6. 1928.

Coreopsis hirta Raf. Ann. Nat. 15. 1820=*Rudbeckia triloba* L. Sp. Pl. 907. 1753 (fide Torr. & Gray, Fl. N. Amer. 2: 349. 1843).

Coreopsis Holstii O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 415. 1899=*Bidens Holstii* (O. Hoffm.) Sherff, Bot. Gaz. 76: 79. 1923.

Coreopsis incisa Ker, Bot. Reg. 1: 7 (*pl.*). 1815=*Bidens incisa* (Ker) G. Don in Sweet, Hort. Brit. ed. 3. 360. 1839.

Coreopsis incurva Moench, Meth. Suppl. 245. 1802=*Bidens Ferulaefolia* (Jacq.) DC. Prodr. 5: 603. 1836 (fide auctorum).

Coreopsis insecta S. L. Moore, Journ. Bot. 46: 42. 1908=*Bidens insecta* (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915.

Coreopsis involucrata Nutt. Journ. Acad. Phila. 7: 74. 1834=*Bidens polylepis* Blake, Proc. Biol. Soc. Wash. 35: 78. 1922.

Coreopsis Jardinii (Schz. Bip.) Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 209. 1890; Fl. Polyn. Franc. 109. 1892=*Bidens Jardinii* Schz. Bip. Flora 39: 360. 1856.

Coreopsis Jasminifolia Bertol. Misc. Bot. 7: 44. 1848=*Bidens mitis* (Michx.) Sherff, Bot. Gaz. 81: 43. 1926.

Coreopsis kilimandscharica O. Hoffm. Bot. Jahrb. 20: 234. 1894=*Bidens kilimandscharica* (O. Hoffm.) Sherff, op. cit. 59: 309. 1915.

Coreopsis Kirkii O. & H. in Oliv. Fl. Trop. Afr. 3: 390. 1877=*Bidens Kirkii* (O. & H. in Oliv.) Sherff, op. cit. 59: 309. 1915.

Coreopsis leucantha L. Sp. Pl. ed. 2. 1282. 1763=*Bidens pilosa* var. *radiata* Schz. Bip. in Bark.-Webb & Berth. Hist. Canar. 3, 2, part 2: 242. 1836–1850.

Coreopsis leucanthema L. Cent. Pl. 1: 29. 1755; Amoen. Acad. 4: 291. 1759=*Bidens pilosa* var. *radiata* Schz. Bip. loc. cit.

Coreopsis leucorhiza Lour. Fl. Cochinch. ed. 2. 622. 1793 (ex descript. et patria)=*Bidens pilosa* var. *minor* (Bl.) Sherff, Bot. Gaz. 80: 387. 1925.

Coreopsis leucorrhiza Lour. op. cit. ed. 1. 508. 1790 (ex descript. et patria)=*Bidens pilosa* var. *minor* (Bl.) Sherff, loc. cit.

Coreopsis Liebmannii Schz. Bip. ex Hemsl. Biol. Centr. Amer. Bot. 2: 196. 1881=*Verbesina intermissa* Blake, Contr. U. S. Nat. Herb. 23: 1578. 1926.

Coreopsis limensis Jacq. Coll. 2: 299. 1788=*Encelia canescens* Lam. Encycl. Meth. 2: 356. 1786 (fide Blake, Proc. Amer. Acad. n. ser. 41: 369. 1913).

Coreopsis linearifolia DC. Prodr. 5: 570. 1836=*Bidens angustissima* HBK. Nov. Gen. et Sp. 4: 183 (233). 1820.

Coreopsis linearifolia O. & H. in Oliv. Fl. Trop. Afr. 3: 390. 1877=*Bidens Schweinfurthii* Sherff, Bot. Gaz. 59: 309. 1915.

Coreopsis lineata Klatt, Ann. Naturh. Hofmus. Wien 7: 103. 1892 =*Bidens grandis* Sherff, *loc. cit.*

Coreopsis lucida Cav. Descr. 224. 1802=*Bidens aurea* (Dryand. in Ait.) Sherff, op. cit. 59: 313. 1915.

Coreopsis Macraei A. Gray, Proc. Amer. Acad. 5: 126. 1861= *Bidens Campylotheca* Schz. Bip. Flora 39: 359. 1856.

Coreopsis macrocarpa A. Gray, loc. cit.=*Bidens macrocarpa* (A. Gray) Sherff, Bot. Gaz. 70: 97. 1920.

Coreopsis Menziesii A. Gray, op. cit. 127=*Bidens Menziesii* (A. Gray) Sherff, op. cit. 70: 98. 1920.

Coreopsis micrantha (Gaud.) A. Gray, loc. cit.=*Bidens micrantha* Gaud. Voy. Freycinet Bot. Pl. 85 (sine descript.). 1830; *ibid.* 464.

Coreopsis mitis Michx. Fl. Bor. Amer. 2: 140. 1803=*Bidens mitis* (Michx.) Sherff, Bot. Gaz. 81: 43. 1926.

Coreopsis molokaiensis (Hillebr.) Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 210. 1890=*Bidens molokaiensis* (Hillebr.) Sherff, op. cit. 70: 97. 1920.

Coreopsis multifida DC. et var. *mutica* DC. Prodr. 5: 573. 1836= *Bidens pilosa* var. *bimucronata f. odorata* (Cav.) Sherff, op. cit. 81: 41. 1926.

Coreopsis nitida H. R. M. ex Elench. Pl. Hort. Bot. J.-J. Destremx 1805: 10. 1806, nomen (ex synon.)=*Bidens aurea* (Dryand. in Ait.) Sherff, op. cit. 59: 313. 1915.

Coreopsis odorata Poir. in Lam. & Poir. Encycl. Suppl. 2: 350. 1811; etiam Lam. & Poir. Atlas *pl. 704, f. 1* (sine anno)=*Bidens pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff, op. cit. 81: 41. 1926.

Coreopsis odoratissima Cav. ex Pers. Syn. Pl. 2: 477. 1807=*Bidens pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff, loc. cit.

Coreopsis Oerstediana Benth. ex Oerst. Kjoeb. Vid. Medd. 93. 1852=*Bidens Oerstediana* (Benth. ex Oerst.) Sherff, op. cit. 80: 385. 1925.

Coreopsis ovata Cav. Icon. et Descr. 3: 41, *pl. 280.* 1795=*Actinomeris ovata* (Cav.) Nutt. ex DC. Prodr. 5: 576. 1836 (cf. Nutt. Gen. 2: 181. 1818).

Coreopsis parviflora Jacq. Hort. Schoenbr. 3: 65, *pl. 374.* 1798=*Cosmos parviflorus* (Jacq.) HBK. Nov. Gen. et Sp. 4: 189 (241). 1820.

Coreopsis polycephala (Schz. Bip.) Benth. & Hook. ex Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 217. 1890; etiam Fl. Polyn. Fr. 108. 1892=*Bidens polycephala* Schz. Bip. Flora 39: 360. 1856.

Coreopsis procera Dryand. in Ait. Hort. Kew. ed. 1. 3: 253. 1789=*Actinomeris alternifolia* (L.) DC. Prodr. 5: 575. 1836.

Coreopsis pulchella O. Hoffm. Bot. Jahrb. 38: 204. 1906=*Bidens microphylla* Sherff, Bot. Gaz. 90: 390. 1930.

Coreopsis quadricornis Krock. Fl. Siles. 2, pt. 2: 481. 1793=*Bidens cernua* L. Sp. Pl. 832. 1753.

Coreopsis Remyi Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 210. 1890=*Bidens micrantha* Gaud. Voy. Freycinet Bot. Pl. 85 (sine descript.). 1830; ibid. 464.

Coreopsis reptans L. Syst. Nat. ed. 10. 2: 1228. 1759; Amoen. Acad. 5: 381 (nomen) et 407. 1760=*Bidens reptans* (L.) G. Don in Sweet, Hort. Brit. edit. 3. 360. 1839.

Coreopsis Ridens Gunn. Fl. Norveg. 2: 87. 1772 (sphalm)=*Coreopsis Bidens* L.=*Bidens cernua* L. Sp. Pl. 832. 1753.

Coreopsis Rueppellii Schz. Bip. ex Walp. Repert. 6: 163. 1846=*Bidens Rueppellii* (Schz. Bip. ex Walp.) Sherff, Bot. Gaz. 90: 389. 1930.

Coreopsis ruwenzoriensis S. L. Moore, Journ. Linn. Soc. 35: 345. 1902=*Bidens coriacea* (O. Hoffm.) Sherff, op. cit. 81: 52. 1926.

Coreopsis Sambucifolia Cav. Descr. 225. 1802=*Bidens Sambucifolia* Cav. Icon. et Descript. 3: 15, *pl. 229.* 1795.

Coreopsis sandvicensis (Less.) Benth. & Hook. ex Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 210. 1890=*Bidens sandvicensis* Less. Linnaea 6: 508. 1831.

Coreopsis scandens Sessé & Moc. Pl. Nov. Hispan. ed. 2. 137. 1893; etiam Fl. Mex. ed. 2. 194. 1894=*Bidens squarrosa* HBK. Nov. Gen. et Sp. 4: 187 (238). 1820.

Coreopsis Schaffneri A. Gray, Proc. Amer. Acad. 19: 15. 1883=*Bidens Schaffneri* (A. Gray) Sherff, Bot. Gaz. 56: 493. 1913.

Coreopsis Schlechteri (Sherff) Burtt Davy in Kew Bull. 568. 1935=*Bidens Schlechteri* Sherff, Bot. Gaz. 76: 146. 1923.

Coreopsis Seretii DeWild. Ann. Mus. Congo, ser. 5. 2: 212. 1907=*Bidens Seretii* (DeWild.) Sherff, op. cit. 76: 162. 1923.

Coreopsis serrata DC. Prodr. 5: 595. 1836=*Bidens laevis* (L.) Britton, Sterns, & Poggenb. Prel. Cat. 29. 1888.

Coreopsis serrulata Poir. Encycl. Suppl. 2: 352. 1811=*Bidens serrulata* (Poir.) Desf. Cat. Hort. Par. ed. 3. 186. 1829.

Coreopsis serrulata (Schz. Bip.) Benth. & Hook. ex Drake del Cast. Ill. Fl. Ins. Mar. Pacif. 210. 1890; etiam Fl. Polyn. Franc. 109. 1892=*Bidens bipontina* Sherff, Bot. Gaz. 85: 10. 1928.

Coreopsis setigera Schz. Bip. ex Walp. Repert. 6: 163. 1846=*Bidens setigera* (Schz. Bip.) Sherff, op. cit. 90: 390. 1930.

Coreopsis simplicifolia (Vatke) Engler, Abh. Preuss. Akad. Wiss. 1891, 2: 435. 1892=*Bidens Dielsii* Sherff, op. cit. 90: 388. 1930.

Coreopsis speciosa Hiern, Cat. Welw. Afr. Pl. 1, pt. 3: 585. 1898=*Bidens grandis* Sherff, op. cit. 59: 309. 1915.

Coreopsis Steppia Steetz in Peters, Nat. Reise Mossamb. Bot. 496. 1862–1864=*Bidens Steppia* (Steetz) Sherff, op. cit. 76: 82. 1923.

Coreopsis Stuhlmannii O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 415. 1899=*Bidens Stuhlmannii* (O. Hoffm.) Sherff, op. cit. 76: 158. 1923.

Coreopsis tanna Forst. ex Steud. Nomencl. ed. 2. 1: 420. 1840=*Glossogyne tenuifolia* Cass. Dict. Sci. Nat. 51: 475. 1827.

Coreopsis tannensis Spreng. Fl. Hal. Mant. 53. 1807=*Glossogyne tenuifolia* Cass. loc. cit.

Coreopsis Taylori S. L. Moore, Journ. Bot. 44: 22. 1906=*Bidens Taylori* (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915.

Coreopsis ternata Chiov. Ann. Bot. Roma 9: 74. 1911=*Bidens ternata* (Chiov.) Sherff, op. cit. 90: 391. 1930.

Coreopsis tetragona Cerv. ex La Llave & Lex. Nov. Veg. Descr. 1: 31. 1824=*Bidens aurea* (Dryand. in Ait.) Sherff, op. cit. 59: 313. 1915.

Coreopsis trichosperma Michx. Fl. Bor. Amer. 2: 139. 1803=*Bidens coronata* (L.) Britt. Bull. Torr. Bot. Club 20: 281. 1893; cf. Sherff, op. cit. 56: 495. 1913.

Coreopsis trichosperma var. *tenuiloba* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 295. 1884=*Bidens coronata* var. *tenuiloba* (A. Gray) Sherff, op. cit. 86: 446. 1928.

Coreopsis trifida Poir. Encycl. Suppl. 2: 353. 1811=*Thelesperma filifolium* A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 301. 1884.

Coreopsis trifoliata Bertol. Fl. Guat. 36. 1840=*Bidens squarrosa* HBK. Nov. Gen. & Sp. 4: 187 (238). 1820.

Coreopsis trilobata Vahl ex Klatt, Leopoldina 23: 90. 1887= *Montanoa pauciflora* Klatt, loc. cit.

Coreopsis tripartita M. B. Moss, Kew Bull. 184, 196. 1929=*Bidens Mossii* Sherff, Bot. Gaz. 92: 202. 1931.

Coreopsis ugandensis S. L. Moore, Journ. Linn. Soc. 35: 347. 1902 =*Bidens ugandensis* (S. L. Moore) Sherff, op. cit. 59: 309. 1915.

Coreopsis variifolia Salisb. Prodr. 206. 1796=*Bidens reptans* (L.) G. Don in Sweet, Hort. Brit. ed. 3. 360. 1839.

SPECIES INCERTAE SEDIS

Coreopsis acuta Pursh, Fl. Amer. Sept. 2: 569. 1814 (*Conopsis acuta* Pursh ex Less. Syn. Gen. Compos. 228. 1832—sphalm). Georgia. "Is perhaps *Actinomeris squarrosa* Nutt." (Torr. & Gray, Fl. N. Amer. 2: 349. 1843.)

Coreopsis aspera Pursh Fl. Amer. Sept. 2: 570. 1814. Maryland. "Not identified and probably not of the genus" (A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 290. 1884).

Coreopsis bituminosa Noronha, Verh. Batav. Gen. 5. ed. 1. Art. IV. 11. 1790. Malaya.

Coreopsis brasiliensis Colla, Herb. Pedem. 3: 479. 1834.

Coreopsis emarcida Noronha, Verh. Batav. Gen. 5. ed. 1. Art. IV. 11. 1790. Malaya.

Coreopsis flexicaulis Raf. Med. Repos. N.Y. Hexade 2. 5: 361. 1808. Southern New Jersey. "Not identified and probably not of the genus" (A. Gray, Syn. Fl. N. Amer. 1, pt. 2: 290. 1884).

Coreopsis (per errorem typ. *Cereopsis*) *gracilis* Blanco, Fl. Filip. ed. 2. Suppl. 591. 1845. (Cf. Fernández-Villar in Blanco, op. cit. ed. 3. *pl. 287*. 1878–1880; etiam Merrill, Sp. Blanc. 380. 1918.)

Coreopsis japonica Hort. Dammann ex Wien Ill. Gartenzeit. 20: 438, *f. 41*. 1895. Japan.

Coreopsis lanceolata var. *longipes* Kew Bull. App. 2: 68. 1931. Nomen nudum.

Coreopsis minima Hort. ex Steud. Nom. ed. 2. 1: 420. 1840. North America.

Coreopsis Neaei DC. Prodr. 5: 573. 1836. South America.

Coreopsis perfoliata Walt. Fl. Carol. 214. 1788. Carolina. Cf. *Bidens laevis* (L.) Britton, Sterns, & Poggenb. Prel. Cat. 29. 1888. (The small Walter Herbarium in London (Brit.) lacks a specimen of *C. perfoliata*.)

Coreopsis philadelphica L. ex Jacks. Ind. Linn. Herb. 62. 1912. Nomen nudum.

Coreopsis radiata Mill. Gard. Dict. ed. 8. *Coreopsis* No. 5. 1768. South Carolina. Perhaps *Bidens laevis* (L.) Britton, Sterns, & Poggenb. Prel. Cat. 29. 1888.

Coreopsis repens Sessé & Moc. Fl. Mex. ed. 2. 194. 1894. Mexico.

Coreopsis scabra Raf. in Robin & Raf. Fl. Ludov. 72. 1817 (*Conopsis scabra* Raf. ex Less. Syn. Gen. Compos. 228. 1832—sphalm). Louisiana.

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